

Clause J.1 Attachment A

DRAFT STATEMENT OF WORK

FOR

NASA Sounding Rocket Operations Contract III

November 2013

**NASA SOUNDING ROCKET OPERATIONS CONTRACT III (NSROC III)**  
**DRAFT STATEMENT OF WORK**

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## **1. SCOPE**

The NASA Sounding Rocket Operations Contract III (NSROC III) serves as the mechanism for the implementation of the NASA Sounding Rocket Program (NSRP). The program utilizes expendable sub-orbital rockets to conduct a host of scientific missions for the study of near earth and space environments and to advance new technologies. Individual mission requirements have historically involved the use of single and multi-stage sub-orbital vehicles lifting payloads with weights ranging from 30 pounds to approximately 1500 pounds to altitudes ranging from 80 to approximately 2000 kilometers. The time required to conduct a specific mission from payload design and development through launch will vary substantially and may range from a few months to two years or longer. Most of these missions are conducted from established launch ranges, while some are conducted as mobile launch campaigns from ranges that have been temporarily established.

The Sounding Rockets Program risk posture is consistent with NASA's goal to provide Low Cost Access to Space (LCAS). Consequently, the Program is governed by NASA NPR 7120.8, NASA Research and Technology Program and Project Management Requirements. Furthermore, the Program operates under an 85% mission success metric established by NASA Headquarters, thus allowing the Program to be tolerant of elevated technical risks on each mission.

The NSROC III Statement of Work (SOW) requires the Contractor to operate and maintain the government-owned facilities located at NASA's Wallops Flight Facility, Wallops Island, Virginia (WFF) and at White Sands Missile Range, White Sands, New Mexico (WSMR). The Contractor shall be responsible for conducting sounding rocket operations from multiple launch sites, including remote launch campaigns. NASA sounding rocket launch sites include Poker Flat Research Range in Fairbanks, Alaska (PFRR) and Andoya Rocket Range in Andenes, Norway (ARR). Mobile launch sites include Reagan Test Site in Kwajalein Atoll and Woomera Test Range in Woomera, Australia. Additional mobile launch sites could be established and utilized during the duration of the NSROC III contract. The sounding rocket program historical mission manifest over the past 15 years is provided in Enclosure 1, Table 1. The anticipated annual launch rate for NSROC III is approximately 15-20 missions. On average throughout a year, 45-55 missions are in progress at various stages of the mission lifecycle and of varying complexities.

NASA will retain overall management of the NSRP including certain programmatic elements such as mission selection, mission management during the mission formulation phase (from mission initiation to requirements definition), funding, international agreements, grant administration, oversight and approval of the ground and flight safety process, and ownership of program assets. NASA provides management oversight of the NSROC through the NASA Contracting Officer's Representative (COR). The Contracting Officer (CO) will assign the COR who is nominated by the Chief of the Sounding Rocket Program. The Contractor shall report directly to the COR and CO.

Authorizations and approvals will be provided through the COR and CO as required. Direction of work will be given by NASA to the Contractor only with cognizance and approval of the COR.

For each mission NASA will assign a Sounding Rocket Program Office (SRPO) Mission Oversight Monitor (MOM) who will be responsible for managing the mission during the mission formulation phase (from the Mission Initiation Conference to the Requirements Definition Meeting) and will provide NASA oversight to the mission throughout the rest of the mission lifecycle. The SRPO MOM will manage the schedule during the mission formulation phase, will work with the Principal Investigator to define appropriate comprehensive and minimum success criteria for the mission, will set mission requirements, and will verify mission requirements are being met throughout the execution of the mission. The SRPO MOM will attend payload team meetings, milestone meetings, and will have approval authority of the Design Review and Mission Readiness Review panel membership. If the SRPO MOM is unable to attend a required mission meeting the SRPO MOM shall designate an alternate SRPO representative, the SRPO Duplicate Authority Designee (DAD), to attend in their place.

This SOW contains Core Requirements to be implemented on the effective date of the contract through the period of performance (including the end date with exercise of options). There are three areas of Core Requirements: Management, Mission Technical Requirements, and Development and Routine Projects Assignments (DRPA).

#### Management:

The business management and program implementation management requirements of the Core contract are described in Section 2.1 of the SOW. The Contractor shall be responsible for providing all of the technical, business, and program management functions necessary to plan, organize, administer, implement, control, track, report, and deliver all requirements within the scope of the NSROC III as described in this SOW. The Contractor shall be responsible for administrative support of its personnel, procurements, and facilities maintenance to include timely and accurate financial and status reports in accordance with the contract. The Contractor shall operate in compliance with applicable federal and state laws and within applicable government and NASA agency regulations, requirements, standards, policies, and procedures to include the documents specified in Applicable Standards and Policies Documents – Section J.1, Attachment O.

#### Mission Technical Requirements:

The mission technical requirements of the Core contract are described in Section 2.2 of the SOW along with a mission model that Offerors shall use for bidding purposes in their proposals. The NSROC III Contractor shall be responsible for the technical effort required for coordination and implementation of the overall NSRP and be responsible for providing services and supplies (i.e. labor, material, equipment, etc.) as necessary to implement the individual missions and projects at all launch sites, including remote sites. As such, the Contractor shall design, analyze, fabricate, integrate, and perform flight qualification testing of sub-orbital payloads; provide launch vehicles and associated

hardware; and provide support of subsequent mission launch operations.

The sounding rocket program historical mission manifest over the past 15 years is provided in Enclosure 1, Table 1. The number of missions launched and complexity of missions given to the NSROC III Contractor as the annual mission model will vary depending on the type of science missions selected by NASA Headquarters annually, but the overall level of effort with the 45-55 missions in progress at all times along with the other core requirements required maintains a balanced work load for the NSROC III contractor staff. Thus, in one year there may be a greater number of higher complexity missions launched, but a lower overall launch rate; or, in another year there may be a greater number of lower complexity missions launched, but a higher overall launch rate.

Development and Routine Project Assignments (DRPA):

The development and routine projects that will be assigned to the NSROC III Contractor are described in Section 2.3 of the SOW along with a DRPA model that Offerors shall use for bidding purposes in their proposals. The DRPA work is assigned in addition to the sounding rocket missions; thus the amount of annual DRPA work assigned each fiscal year will fluctuate depending on the workload effort required by the annual mission model selected by NASA Headquarters. The sounding rocket program historical development and routine project assignments are provided in Enclosure 1, Tables 2 and 3. The Contractor shall be responsible for providing support for the NSRP in the following areas not directly related to implementation of NSRP missions including, but not limited to:

- Technical
  - Design and analysis (mechanical, structural, electrical, electronic, flight performance, flight dynamics, control system, software, etc.);
  - Fabrication (mechanical, structural, electrical, electronic, etc.);
  - Environmental testing of flight and ground support hardware and systems;
  - Ground Support Equipment (GSE) design, fabrication, maintenance, modification, upgrade, and refurbishment;
  - Engineering analytical support tasks and data reduction;
  - Development of new or modification of existing sounding rocket launch vehicles, payload support systems and subsystems, and components;
  - Major efforts related to installation, reconfiguration, refurbishment, or upgrades of sounding rocket launchers;
  - New sensor (pointing, position, environmental conditions, etc.) development for flight and ground systems;
  - Software development;
  - Special engineering and environmental studies and support;
  - General drafting and technical support; and
  - Field, launch range, and post flight operations.
- Technical Management
  - Project management support;
  - Internships, education and outreach activities; and
  - Reimbursable mission feasibility studies and planning activities.
- Technical Administration

- Engineering and technician support related to inspection and acceptance testing of all program supplies including the acquisition of new materials, commercially available rocket motors, equipment, hardware, components, and standard flight systems and subsystems (payload and vehicle) for Program inventory; and
- Refurbishment of hardware and systems returned to inventory for reutilization on future missions.

## **2. CORE REQUIREMENTS**

### **2.1.MANAGEMENT**

The Contractor shall provide all technical, business, and program management functions necessary to plan, organize, implement, control, track, report, and deliver all requirements within the scope of the NSROC III as described in this SOW. Business management and program implementation shall include all elements in Subsections 2.1.1 through 2.1.2 of this section and any other functions determined by the Contractor to be necessary based on their technical and business approach to contract performance. The Contractor shall provide and implement these functions in accordance with a comprehensive and coordinated management approach.

The Government shall create, provide, and maintain a Contract Work Breakdown Structure (CWBS) organized to graphically reflect the desired approach to providing the major performance outputs required by the NSROC. This Work Breakdown Structure is provided in Section J.1, Attachment K and the Contractor shall follow it as a basis for contract planning, budgeting, scheduling, and costing in addition to tracking and reporting to the Government.

#### **2.1.1. BUSINESS MANAGEMENT**

The Contractor shall provide for the NSROC III contract management, reviews, and reporting; financial resources management; subcontract management; information and document management; and utilization of Government Property.

##### **2.1.1.1. CONTRACT MANAGEMENT, REVIEWS, AND REPORTING**

The Contractor shall provide overall management of the prime contract requirements. The Contractor shall provide for informal technical interchange between contractor and NASA personnel as requested by NASA (including other NASA contractor personnel) for the purpose of assuring insight into problems involved in the performance of NSROC III requirements. The Contractor shall develop and maintain all documentation and reporting required by the SOW and the contract schedule. The CWBS shall serve as the framework for all reporting to NASA.

#### **2.1.1.2. FINANCIAL RESOURCES MANAGEMENT**

As a minimum, the resource management system shall track and report (in accordance with the financial reporting requirements of Section J.1, Attachment G) individual mission costs and individual DRPA project costs.

The Contractor shall participate in a monthly Financial Status Review, described further in Section 2.1.2.4, to provide financial status and planning required to support the Government budget planning process. The Contractor and Government shall jointly discuss planned material purchases and projected work force resource requirements and evaluate against the mission manifest. At each monthly Financial Status Review the Contractor shall provide the financial status of planned versus actual spending, review materials budget by discipline and the status of procurements in each area, discuss any vendor or supply chain issues, summarize costing of major acquisitions if funds extend through multiple fiscal years, and review the projected cost and work force requirements for the next reporting period. The format and content of the Contractor's inputs and supporting rationale shall be in accordance with the budget or special request guidelines and reporting format specified by NASA.

#### **2.1.1.3. WORK ORDER TRACKING**

Missions and DRPA projects will be assigned to the Contractor by SRPO through work orders. The Contractor shall develop a work order tracking process for managing SRPO requests and work activities under the contract. This process shall include the capability to track status of requests (as appropriate) and provide workload data. The overall process is not required to be a single integrated information system, but may consist of multiple independent systems and processes.

#### **2.1.1.4. SUBCONTRACT MANAGEMENT**

The Contractor shall provide all management functions for all interdivisional, subcontractor, and major vendor activities necessary to accomplish the NSROC III requirements.

As part of its phase-in activities, the Government will provide the Contractor with a report detailing the long-lead items (i.e. rocket motors, boost guidance systems, recovery systems, etc.) that the incumbent contractor for NSROC II has subcontracted to purchase, but that will not be delivered under the NSROC II contract. By the end of the phase-in period for the NSROC III contract, the Contractor shall assume responsibility for these subcontracts by an appropriate contract mechanism such as novation agreement.

Thirty days prior to the end of the NSROC III contract period, the Contractor shall submit to the Government a report detailing the long-lead items (i.e. rocket motors, boost guidance systems, recovery systems, etc.) that will not be delivered within a one year period after the end of the period of performance of the NSROC III contract, and the Contractor shall turn over responsibility for these subcontracts to the incoming

Contractor by the end of the phase-in period for the follow-on contract.

#### **2.1.1.5. INFORMATION AND DOCUMENT MANAGEMENT**

The Contractor shall assume responsibility for, maintain, and enhance the Well Organized Central Repository (WOCR) for all documentation and reporting information required under this contract. The Contractor shall modify as necessary, maintain, and operate this repository so that NASA and NASA designated personnel (including as necessary, NASA contractor, and other personnel) can easily and routinely access, locate, and utilize the documentation and reporting information contained therein. Access to the repository shall be available through the Wallops Local Area Network (LAN) and shall be organized such that access can be restricted in accordance with requirements associated with the various types of information (i.e. contract, financial, technical, and historical). The repository and system utilized for its operation shall not employ any proprietary Contractor software and shall be structured so that it will be easily transitioned to follow on contracts. All documentation and reporting information contained therein shall be the property of NASA in accordance with the Data Rights clauses of this contract.

Information that shall be maintained within the repository includes, but is not limited to: Contract Work Breakdown Structure; Overall Programmatic Schedule for all missions; Occupational Safety and Health Plan/Manual; Quality Manual; Configuration Management Control Plan; Training Plan and Training, License, and Permit Records; Risk Management Information for each mission or project; all required Annual and Monthly Reports; Resource Management System Data; Financial reports; Quality Assurance (QA) and any other audit reports, including but not limited to – software assurance, Quality Audit Assessment and Review (QAAR), Anomaly Investigation Board (AIB), International Organization for Standardization (ISO), Occupational Safety and Health Administration (OSHA); export control technical assistance agreement (TAA) documentation/status; Information Technology (IT) security documentation; current up-to-date electronic copy of the NSROC III contract, including mods; and links or other forms of electronic access to all technical and safety documentation associated with each NSROC III sounding rocket mission and the overall program including analyses, designs, drawings, schematics, procedures, and flight performance reports.

Minimum documentation for each mission shall include: all Mission Initiation Conference, Requirements Definition Meeting, Design Review Meeting, Mission Readiness Review Meeting, and Action Item assignment and disposition documentation; Preliminary Hazard Assessments; Flight Requirements Plans; Flight Worthiness Assessments; Range Safety Data Packages; Mission Closeout Reports; as built fabrication documentation including specifications, drawings, wiring books, and schematics; related quality control and configuration management documentation. Ground and Flight Safety Plans; wind weighting data at time of launch; and all anomaly and failure reports. Paper archives are permissible for completed motor logs and vehicle/payload inspection, test and assembly procedures; and similar hand-written records.

The repository shall also include a database of Lessons Learned organized such that it can be searched and reviewed by discipline and function so that past experiences can be applied to current and future missions to facilitate efficiencies and prevent the recurrence of negative events.

The Contractor shall also maintain the NASA Sounding Rockets Program Empirical Flight Dispersion Database as part of the repository. The Contractor shall update the Empirical Flight Dispersion Database, with NSROC III and other relevant sounding rocket mission data and information as post-flight reports are completed. Inputs shall include, but not be limited to: type of launch vehicle; predicted and actual performance specifications; payload physical properties; vehicle and payload failures and associated causes; and empirical dispersions.

#### **2.1.1.6. GOVERNMENT PROPERTY**

The Contractor shall operate, maintain, and provide sustaining engineering and logistics support for all Installation-Accountable Government Property furnished and utilized for performance of the contract effort. This includes: mechanical and electrical fabrication facilities, telemetry ground stations, attitude control system laboratories and facilities, and environmental testing facilities located at Wallops Flight Facility; and environmental testing, telemetry tracking, data acquisition, and up-link command facilities located at White Sands Missile Range. A listing of Installation Provided Government Property is provided in Section J.1, Attachment D.

The Contractor shall honor requests (as approved by the COR and on a non-interference basis) from other government agencies, other Wallops support contractors and government personnel, and universities and scientists supporting activities related to sounding rocket operations for short term loans of contract property.

The Contractor shall track, maintain, and provide sustaining engineering for government owned sounding rocket launchers, including those mobile and permanently installed launchers on Wallops Island and those semi-permanently installed at Poker Flat Research Range, Alaska; Andoya Rocket Range in Andoya, Norway; Reagan Test Site in Kwajalein Atoll; and Woomera Test Site in Woomera, Australia. This includes preventative maintenance, launcher modifications and reconfiguration, functional tests, load tests, spare parts inventory, documentation, and engineering analysis as required to support SRPO missions. Other major launcher maintenance and refurbishment efforts outside the scope of routine maintenance and configuration will have work orders assigned under DRPA. A list of Government owned sounding rocket launchers is included in Table 1.

Table 1. Government Owned Sounding Rocket Launchers by Launch Sites

LAUNCH SITE	LAUNCHER DESCRIPTION	LAUNCHER CONDITION
Wallops Island, Virginia	50k, Pad 1	Installed and functional
	ARC, Pad 2	Installed and functional
	MRL, Pad 2 (MOBILE)	Installed and functional

Poker Flat Research Range, Alaska	MRL, 7.5k, Pad 1	Installed and functional
	AML, 20k, Pad 3	Installed and functional
	Athena, Pad 4	Installed and functional
	Super-HAD, Pad 5	Installed and functional
Andoya Rocket Range, Norway	Athena	Installed and functional
Reagan Test Site, Kwajalein Atoll	AML, 20k	Installed and functional
	MRL, 7.5k	Pedestal installed, boom in storage box at Kwajalein
	Super-HAD (MOBILE)	Launcher in storage box at Kwajalein
Mobile Launchers - Operational	Super-HAD (MOBILE)	Launcher in storage box at Wallops Flight Facility
	MRL (MOBILE)	Launcher in storage box at White Sands Missile Range
	AML, 20k (MOBILE)	Launcher installed at Nevada Test Site

The Contractor shall implement a comprehensive proactive maintenance program for all government property. All required maintenance tasks shall be performed in accordance with the original manufacturer's specifications as necessary to keep the government property functioning in accordance with government safety and property management requirements and standards.

The Contractor shall interface with WICC and provide alternate Facility Operation Management personnel for each real property (i.e. buildings, structures, systems, and sub-systems) that is used or occupied by the NSROC III Contractor for contract use. The Facility Operations Manager (FOM) will interface with the Wallops Facilities Management Branch for real property maintenance, repair, modification, emergency preparedness, and construction activities per NASA GPR 8830. Note a list of applicable and required policies and standards is provided in Section J.1, Attachment O of the contract.

The existing GSFC/WFF Recertification (RECERT) Program will provide RECERT services to the Contractor for equipment and facilities located at WFF. These services shall be limited to the performance of the frequent and periodic inspections for Lifting Devices and Equipment (LDE) and non-flight pressure vessels and systems. This includes performing the required formal load test for LDE. As part of these services, the RECERT program will also provide formal training for LDE operators.

The Contractor may use the following institutional services, to the extent they are available, in the performance of this contract. The Contractor's decision to use these services shall not in any way relieve the Contractor of responsibility for performance under this contract. Utilization of these services shall be accomplished through the use of a job order number authorized by the Sounding Rocket Program Office.

- (i) General purpose vehicle operations for vehicle maintenance;

- (ii) Moving and hauling services;
- (iii) Rigging and heavy lifting of program hardware;
- (iv) Services of the WFF Antenna Range.
- (v) Reproduction services as available at the Wallops Duplicating Facility, Building F-1.
- (vi) Transportation and shipping for domestic shipments on a third party basis.
- (vii) The Contractor may use on a rent-free non-interference basis the following Government-owned equipment as may be required in performance of this contract at Wallops Flight Facility, White Sands Missile Range, the United States Army Kwajalein Atoll, and at other locations as may be approved by the contracting officer. The Contractor is responsible for ensuring that all operators have been properly trained and certified, as applicable, to use the provided equipment.
  - a. Forklifts;
  - b. Tow Carts;
  - c. Cranes; and
  - d. Personnel Lifts.
- (viii) Calibration services as available at the Wallops Calibration Laboratory.

The Contractor shall specify a Facility Operations Management (FOM) site lead for the White Sands, New Mexico Vehicle Assembly Building (VAB) facility. The FOM will be the day-to-day interface with the White Sands Missile Range NAVY and ARMY organizations, as well as NASA's White Sands Test Facility (WSTF) personnel for property maintenance, repair, modification, emergency preparedness, testing/certification, and construction activities. The Contractor shall utilize the White Sands Test Facility (WSTF) for calibration services of non-flight, facility-related hardware. The Contractor shall keep the SRPO Operations Manager apprised of all such activities.

The Contractor shall provide property management system support that meets the requirements of FAR 45-Government Property and NFS 1845-Government Property. The NSROC III Contractor shall track all Institutional Accountable Government Property drawn from Program Stock. This information shall be provided in spreadsheet format to the COR on a monthly basis and shall contain the item description, cost, and work order number to which it was assigned. The Contractor shall participate in audits and reviews, as deemed necessary by the government, for checking the maintenance and accuracy of their property management system support.

The Contractor shall procure, receive, and accept into inventory as necessary, all program

supplies such as material, hardware, components, and equipment required for implementation of the NASA Sounding Rockets Program. The requirements for procuring inventory items along with the labor required for inspection, refurbishment, and testing (if required) will be assigned as a DRPA work order.

NASA will obtain surplus military hardware and motors as required by the NASA Sounding Rockets Program and will subsequently provide them to the Contractor as Installation-Accountable Government Property.

The Contractor shall be responsible for procuring commercially available rocket motors for the NSRP. The Contractor shall monitor both programmatic progress of the rocket motor vendor and technical performance of the rocket motor. The Contractor shall establish a formal acceptance process for the rocket motors, and shall keep SRPO involved in programmatic and technical decisions regarding rocket motors.

The Contractor shall develop and maintain an Information Technology (IT) Security Plan and associated documentation for any applicable GSE due TBD.

The Contractor shall develop a stock and inventory management system to track and control all program supplies to ensure that all are available to support contract requirements when needed. The Contractor shall provide support for the acquisition, utilization, refurbishment, and disposal of program supplies so as to minimize contract cost to the government. The Contractor shall identify excess and obsolete supplies and provide notification to the government for approval for disposal. The Contractor shall maintain assigned property including documentation indicating type and date of maintenance and calibrations performed. The Contractor shall also provide all equipment calibrations necessary to keep instruments operating within manufacturer's specifications.

For rocket motors and pyrotechnic devices, the Contractor shall keep and make available to NASA records which document continuous compliance with manufacturer's storage, transport, and operational recommendations. The Contractor shall be responsible for maintaining and operating assigned explosive storage areas to all applicable safety requirements. The Contractor shall support other non-Sounding Rockets Program Office codes, agencies, and tenants in meeting explosive/hazardous material storage requirements. The Contractor shall provide support, as necessary, to all incoming and outgoing explosive shipments at Wallops Flight Facility. The Contractor shall provide technical support to the Wallops Flight Facility Safety and Environmental Offices for any explosive/ordnance issues that may arise.

### **2.1.2. PROGRAM IMPLEMENTATION**

The NSROC III Contractor shall implement the following: contract transition phase in and phase out; required reviews; a safety and quality assurance program; configuration management; risk management; systems engineering; and a training and certification. Further, the Contractor shall provide program support for SRPO identified activities,

comply with export regulations, and utilize government provided office automation and devices services.

#### **2.1.2.1. CONTRACT TRANSITION**

The Contractor shall assume full responsibility for all contractual obligations beginning with the effective date of the contract. The Contractor shall complete the inventory of all Installation-Accountable Government Property within ninety (90) calendar days of the effective date of the contract. Such property shall be assumed to be reasonably acceptable for use in the execution of this contract unless the contractor documents otherwise and obtains concurrence from the government.

As stated in Section 2.1.1.4, as part of its phase-in activities, the Government will provide the Contractor with a report detailing the long-lead items (i.e. rocket motors, boost guidance systems, recovery systems, etc.) that the incumbent contractor for NSROC II has subcontracted to purchase, but that will not be delivered under the NSROC II contract. By the end of the phase-in period for the NSROC III contract, the Contractor shall assume responsibility for these subcontracts by an appropriate contract mechanism such as novation agreement.

As of the effective date of the contract, the Contractor will be provided operational and storage facilities for the conduct of the contract. However, during the term of the contract, the Contractor may be required to relocate personnel and functions to alternate facilities as directed by the Wallops Facilities Management Branch for such issues as renovations, modifications, and health and safety. The Contractor is responsible for assigning office spaces within the facility provided, for ensuring that telephone, computer network drops, and other necessary infrastructure services are arranged for and in-place prior to relocation, and for coordinating employee packing and moves to coincide with any moving requirements. The Contractor has the same coordinating responsibilities for relocating back to the primary worksite should this become necessary.

The Wallops Facilities Management Branch will invite the Contractor to participate in the planning for the work to be accomplished in buildings/spaces assigned to the contractor. It is the Contractor's responsibility to ensure that planning input is made to permit for the continuity of Contractor operations to meet mission schedules.

#### **2.1.2.2. CONTRACT TRANSITION PHASE OUT**

The Contractor shall make available to the successor contractor all written and electronic operating instructions, maintenance instructions, documentation, company names and contact information (address, phone number, etc.) of vendors, hardware/software utilities, and all other procedures acquired at the beginning of the NSROC III contract and subsequently developed in the performance of this contract. The Contractor shall also make available to the successor contractor all written and electronic copies of all historic data, including but not limited to: tests; reports; procedures; schematics; drawings; and diagrams developed and documented in the performance of this contract. This

documentation shall be transferred to the successor contractor by the start date of the follow on contract.

The Contractor shall cooperate to effect an orderly and efficient transition to any such successor contractor during a transition period to be specified by the CO.

To effect this transition, the Contractor shall provide a Phase-Out Plan 90 days after request by the Contracting Officer. The Plan shall conform to the content prescribed by the Contracting Officer.

Ongoing operations shall be coordinated with management and administrative personnel of the successor contractor. A current listing of all Installation-Accountable Government Property, effective as of the end of the contract period, shall be provided. The Contractor agrees to cooperate with NASA in completing the transfer of all Installation-Accountable Government Property to the successor contractor.

As stated in Section 2.1.1.4, thirty days prior to the end of the NSROC III contract period, the Contractor shall submit to the Government a report detailing the long-lead items (i.e. rocket motors, boost guidance systems, recovery systems, etc.) that will not be delivered within a one year period after the end of the period of performance of the NSROC III contract, and the Contractor shall turn over responsibility for these subcontracts to the incoming Contractor by the end of the phase-in period for the follow-on contract.

### **2.1.2.3. MISSION AND DRPA PLANNING AND SCHEDULING**

The Contractor shall provide all planning and scheduling associated with DRPA projects and individual mission requirements, beginning after the completion of the SRPO led mission formulation phase. Each mission and DRPA project shall be planned and scheduled so that it does not interfere with the timely and cost efficient completion of all other ongoing missions and DRPA projects.

The Contractor shall furnish accurate and timely scheduling information for both DRPA projects and missions that provides the government sufficient insight into the Contractor's ability to: analyze, mitigate, and control scheduling risks; maintain programmatic flexibility; maximize performance; and optimize the use of available resources

The Contractor shall develop, implement, and maintain an overall integrated schedule for all missions reflecting, as a minimum, the planned schedule for the following milestones: Actual Mission Initiation Conference (MIC) date and actual Requirements Definition Meeting (RDM) date; planned design, Design Review (DR), fabrication and assembly, Pre-Integration Review (PIR), integration and testing, Mission Readiness Review (MRR), field operations, launch date, post flight activities including the delivery of all data products, and Mission Close-out Report (MCR). The mission schedule shall identify the resources required for each mission relative to the planned activity and have the

capability to identify conflicts for these resources between the various missions. The overall integrated mission schedule shall be provided and maintained in accordance with the requirements of each mission.

The overall mission schedule shall be reviewed with NASA on a monthly basis at the Mission Scheduling Meeting, described in Section 2.1.2.4. The DRPA projects schedule information shall be reviewed with NASA on a monthly basis at the DRPA Projects Review, described in Section 2.1.2.4.

#### **2.1.2.4. REQUIRED REVIEWS AND MEETINGS**

The Contractor shall participate in, and provide technical support for programmatic meetings, internal NSROC meetings with SRPO presence, and mission related meetings as detailed in Table 2. Additional meetings shall be supported by the Contractor as deemed necessary by SRPO. These meetings and reviews include presentations and discussions on the Contractor's implementation status, impacts on the Program due to proposed requirement changes or budget and funding conditions, or any aspect of the program for which the Contractor is responsible. The Contractor shall provide a written weekly programmatic status report to the SRPO Chief and participate in informal weekly meetings with SRPO upon request.

Table 2. Required Reviews and Meetings

PROGRAMMATIC MEETINGS					
MEETING NAME	MINIMUM FREQUENCY	DESCRIPTION	DELIVERABLE	SRPO ROLE	NSROC III PANEL/BOARD MEMBERSHIP
NSROC-SRPO Program Review	Monthly	Comprehensive program status review that covers high level technical issues, mission schedules and upcoming milestones, staffing levels, resource status, training activities, outreach activities, facilities status and open/planned work orders, development efforts status, identification of critical issues, production status, safety and mission assurance status (deliverables, audits, inspections, ISO surveillance, non-conformances, corrective actions, change requests, GIDEP), business status (spending levels and planned spending), and subcontracts status.	Presentation that addresses the items listed in the description.	SRPO Chief SRPO COR and SRPO technical staff attend	NSROC III Management
Mission Scheduling Review	Monthly	Technical status and schedule of mission manifest, high level discussion of mission-related programmatic, critical issues, or systemic issues	Current Master Mission Schedule	SRPO Chief and SRPO MOMs attend	NSROC III Management and Operations Staff as needed
Financial Status Review	Monthly	Review Contractor financial status, review planned versus actual spending in a format defined by the SRPO, review materials budget by discipline and status of procurements in each area, discuss any vendor or supply chain issues, summarize costing of major acquisitions if funds extend through multiple fiscal years.	Monthly 533	SRPO Chief and SRPO COR attend	NSROC III Management and Finance Personnel
Sounding Rocket Working Group	Bi-Annual	Twice yearly meeting between NASA SRPO, NSROC, and the Principal Investigator community (led by the NASA Project Scientist) to provide a forum for exchange of information on sounding rocket systems, operational support, new developments within NSROC, and developments in science as they affect the Sounding Rocket Program.	Presentation on NSROC status, critical issues, and new developments	SRPO Chief and Staff attend and present	NSROC III Management and Engineering Leads (if relevant to presentation)
Launch Range Reviews	As needed	Brief launch ranges as needed/requested on status of vehicles, sub-systems, safety systems, ground support equipment, or other mission-specific or programmatic items as determined by SRPO.	Support SRPO with presentation development	SRPO technical staff attend and may present	Determined on case-by-case basis
Technical Interchange Meetings	As needed	Provide guidance to and answer questions for prospective customers regarding sounding rocket capabilities and common practices. Engage in preliminary mission concept design and concept of operations planning.	Analyses and design concepts as requested by SRPO	SRPO technical staff attend and may present	N/A
NSROC INTERNAL MEETINGS WITH SRPO PRESENCE					
MEETING NAME	MINIMUM FREQUENCY	DESCRIPTION	DELIVERABLE	SRPO ROLE	PANEL/BOARD MEMBERSHIP
Mission Status Meeting	Weekly	Review the progress and status of missions. Review challenges or issues that are affecting the missions. Discuss mission priorities to de-conflict program resources, personnel, or facilities.	Current Master Mission Schedule	SRPO MOMs attend	NSROC III Management, Engineering Leads, and Fabrication Leads
Material Review Board (MRB)	Weekly	Disposition non-conformances, review status of engineering design changes, and review programmatic level corrective actions. Review status of overdue items periodically.	None	SRPO Technical Representative attend	NSROC III Management, SMA Lead, CM Lead, and Engineering Dept. Leads
Configuration Control Board	Monthly – Rotate among	Identify all NSROC standard systems for each engineering discipline related to flight hardware, ground infrastructure, or major processes. The board shall have a governing document that	Updated Configuration Control Document	SRPO Technical Representative attend	NSROC Management Representative, CM

(CCB)	disciplines	identifies each system and defines all the drawings, schematics, procedures, work instructions, and associated reports. The board shall also identify cognizant engineers for all standard systems and peer review design changes for standard systems as they arise.			Lead, and Engineering Dept. Leads
Development and Routine Project Assignments (DRPA)	Monthly – Rotate among disciplines	Review status and schedule of development efforts and routine projects program wide that sustain and enhance the capability of the sounding rocket program. Topics to cover include inventory maintenance and procurement (including status of purchased off the shelf items, purchased major sub-systems, made in-house major sub-systems, and sub-system refurbishment); ground support equipment procurement, development, and maintenance; facilities maintenance; outreach activities; and internal engineering, testing, or production development projects to standardize, modernize, or enhance the capabilities of the sounding rocket program.	Presentation on status of development and routine assignments	SRPO Technical Representative attend	NSROC management and Engineering Dept. Leads
Fabrication Status Meeting	Weekly	Review mechanical and electrical fabrication resource loading and prioritization of work in queue.	None	SRPO Technical Representative attendance optional	NSROC Management Representative, Fabrication and Engineering Dept. Leads
<b>MISSION MEETINGS (additional detail in Section 2.2)</b>					
MEETING NAME	MINIMUM FREQUENCY	DESCRIPTION	DELIVERABLE	SRPO ROLE	PANEL/BOARD MEMBERSHIP
Payload Team Meetings	As needed	Held periodically during the course of a mission to gauge progress, disseminate information, resolve issues, and maintain schedules.	Action Item List for Team	SRPO MOM Participant	Assigned Mission Team
Mission Initiation Conference (MIC) (NASA meeting)	Each mission	SRPO Mission Oversight Monitor chairs the meeting and the Principal Investigator presents the mission overview; science objectives; and preliminary performance, instrumentation, operational, and schedule requirements to the NSROC team to evaluate during the mission formulation phase.	None	SRPO MOM Chair	NSROC Management Representative, Assigned Mission Team
Requirements Definition Meeting (RDM) (NASA meeting)	Each mission	SRPO MOM chairs the meeting with support from the NSROC mission manager and payload team to present a mission plan that addresses each of the requirements presented at the MIC. The Mission Plan includes the vehicle configuration, mission schedule, preliminary flight performance assessment, preliminary hazard assessment, and a detailed requirements matrix.	RDM Package  RDM Memo (RDMM)  Requirements Matrix	SRPO MOM Chair	NSROC Management Representative, Assigned Mission Team, Engineering Dept. Leads
Fabrication Meeting	As needed	The fabrication meeting enables NSROC engineering and fabrication to meet and discuss the fabrication requirements and timelines for vehicle and payload hardware to be manufactured for each mission.	None	SRPO MOM Participant	NSROC Management Representative, Fabrication Leads, relevant Mission Team members
Design Review (DR)	Each mission	The Design Review verifies that the detailed design meets all requirements established at the RDM. All aspects of payload design are discussed and disseminated across all disciplines. Design parameters are summarized, design problems are addressed and resolved, and, should they be required, new designs are verified as complete and ready for fabrication.	Design Review Package and Presentation  DR Memo (DRMM)	SRPO MOM Participant and Panel Member	NSROC Management Representative, Assigned Mission Team, Assigned Panel Chair and Panel Members
Pre-Integration Review (PIR)	Each mission	The integration and testing process for integration of the payload and the flight vehicle is reviewed. At this meeting, the payload, vehicle elements, test plans/procedures, test equipment, facilities and personnel are thoroughly evaluated to ensure successful integration.	None	SRPO MOM Participant	NSROC Management Representative, Assigned Mission Team, Engineering Dept. Leads

Mission Readiness Review (MRR)	Each mission	Reviews the changes since the design review and the test results from the integration and testing mission phase. Verifies that each system – telemetry, electrical, mechanical, environmental, range safety has been checked to ensure a successful mission.	Mission Readiness Review Package and Presentation  MRR Memo (MRRM)	SRPO MOM Participant and Panel Member	NSROC Management Representative, Assigned Mission Team, Assigned Panel Chair and Panel Members
Launch Readiness Review (LRR)	Each mission	Reviews the post MRR state of the mission and open items to be closed prior to launch authorization. Polls relevant disciplines and parties to determine launch readiness and confidence in the mission to meet the defined requirements and success criteria.	LRR Memo	SRPO MOM Participant	NSROC Management, Mission Manager, relevant Mission Team members
Data Review	Each mission	Meeting occurs approximately 2-3 weeks after launch and allows each engineering discipline team member to brief their system performance and note any anomalies or failures that require additional analysis during the mission closeout phase.	None	SRPO MOM Participant	NSROC Management Representative, Assigned Mission Team, Engineering Dept. Leads
Lessons Learned Review	Each mission	Post-launch review with the field team to capture and communicate lessons that the teams have learned through their work on the mission. Process should capture a lesson, communicate the lesson, and then resolve the lesson.	Add lessons learned to WOCR database	No SRPO Participation	NSROC Management Representative, Assigned Mission Team

#### **2.1.2.5. SAFETY PROGRAM**

The Contractor shall develop and implement a proactive Safety and Health Program that will satisfy all requirements outlined in Sections 2.1.2.5.1 and 2.1.2.5.2 below. SRPO will work with the Contractor during contract phase-in to develop a Safety and Health Plan, but the Contractor shall have a released and approved Safety and Health Plan on the effective date of the NSROC III contract.

The Contractor shall provide an organizational structure that will ensure safety oversight and reporting are independent of specific engineering, manufacturing, or other project influences. A single point of contact shall be identified for all efforts and issues related to implementation of this Safety and Health Program. The Contractor shall provide a written plan/manual for approval by NASA that fully describes the Safety and Health Program and provides all necessary information and documentation so that NASA can perform a complete review and verification of the Contractor's Safety and Health Program. The Contractor shall support periodic review and audit functions conducted by the NASA Safety Office. This may include, but is not limited to, review of: Health and Safety Plans; inspection and corrective action reports; mishap reports; hazardous procedures; and/or in-process operations. Since many of the actions performed under this contract have the potential to impact NASA Employees and other NASA Contracts, the Contractor shall be an active member in the Wallops Contractor Safety Council.

The Wallops Safety Office must approve the design and operational processes associated with hazardous systems flown by the NSRP prior to their use. As such, the Contractor shall maintain close coordination with the Wallops Safety Office on these systems to ensure safety requirements are satisfied.

The Contractor shall reimburse the Government for any civil or criminal fines or penalties resulting from any health and safety or environmental infractions caused by the contractor's negligence. Smoking policy, while on duty, shall conform to NASA and Occupational Safety and Health Administration (OSHA) standards.

##### **2.1.2.5.1. GROUND AND FLIGHT SAFETY IMPLEMENTATION FOR RANGE AND LAUNCH OPERATIONS**

All work performed under the contract shall be in conformance with all WFF, GSFC, NASA, and other governmental safety regulations, requirements, and statutes. Ground and flight safety requirements for sounding rocket vehicles, payloads, and related sub systems are contained in the Range Safety Manual (RSM-2002) Rev. C (or latest released revision) for Goddard Space Flight Center (GSFC)/Wallops Flight Facility (WFF). The RSM contains specific design requirements for flight and ground systems and describes data that must be supplied to the Wallops Flight Facility Safety Office to obtain NASA safety approval for launch systems. Institutional safety requirements are contained in NPR 8715.3 and are also addressed in Section 2.1.2.5.2 below. Note: A list including these and other applicable policies

and standards is included in Section J.1, Attachment O of the contract.

Under the direction of the SRPO MOM, the NSROC III Contractor shall work with the Principal Investigator during the mission formulation phase to identify any hazardous systems or ground support equipment used by the experiment team and acquire the necessary documentation and procedures to have the equipment reviewed by the safety offices to gain approval to use the equipment for integration, test, launch operations, or flight.

Under the direction of the SRPO MOM, the Contractor shall develop a Preliminary Hazard Assessment for each mission to be included in the Requirements Definition Meeting package, presented at the RDM, and provided directly to the Wallops Safety Office. This hazard assessment shall include a listing of any items that have the potential to require a waiver at the designated launch range.

The Contractor shall develop a preliminary Flight Worthiness Assessment for each mission to be included in the Design Review package, presented at the DR, and provided directly to the Wallops Safety Office. This preliminary Flight Worthiness Assessment shall include a summary of all deviations from nominal flight worthiness design criteria, rationale for exceeding the nominal design criteria (if applicable), a listing of any new or first use launch vehicle or safety critical flight hardware, and a summary of estimated gravimetric, impact, performance, and dispersion data. An updated Flight Worthiness Assessment (refined by updated designs, measured properties, additional analysis, etc.) shall be provided to the Wallops Safety Office ten working days prior to the Mission Readiness Review.

The Contractor shall provide a comprehensive Range Safety Data Package (RSDP) that contains all of the data required to obtain approval of the flight and ground systems to the Wallops Safety Office for each mission. The RSDP shall be provided to the Wallops Safety Office no later than 90 calendar days prior to the launch. The RSDP shall be updated as necessary when additional information becomes available that invalidates the information provided in previous submittals.

The Contractor shall also be responsible for meeting any additional safety requirements of any other domestic or foreign range utilized during the execution of this contract. Further, the Contractor is responsible to apprise itself of all changes and modifications to statutes, regulations, and procedures impacting Ground and Flight Safety.

NASA is responsible for oversight and approval of the ground and flight safety processes during the execution of all NASA assigned missions and work orders performed under this contract. As such, NASA will review and approve all Safety Plans. The Contractor shall provide all data, analysis, and information necessary for the development of Ground and Flight Safety Plans in the RSDP. The Wallops Safety Office will utilize this information to develop Ground and Flight Safety Plans for local and mobile launch operations, including foreign launch sites. The

Contractor shall be responsible for implementing all of the requirements of these NASA Ground and Flight Safety Plans for tasked missions and general and specific safety requirements associated with work orders. If the Contractor has reason to believe that safety plans fail to effectively address mission safety issue or impose requirements that result in higher than acceptable level of risk, the Contractor shall resolve these differences with the Wallops Safety Office. If no satisfactory resolution is found, the Contractor shall immediately inform the COR and CO of its concerns.

For hazardous operations throughout the mission lifecycle, the Contractor is responsible for providing independent NASA certified safety authorities whose function is to monitor the operations to ensure compliance with approved operating procedures and safety plans. This person or persons, designated as the Operational Safety Supervisor (OSS), shall interface directly with the NASA (or designated range) safety authority in resolving real-time safety concerns. The Wallops Safety Office will periodically audit in-process hazardous operations and/or provide an OSS for certain hazardous operations at its discretion. The Contractor shall assist in these audits and provide all relevant data to NASA Safety authorities for review and inspection.

#### **2.1.2.5.2. OCCUPATIONAL SAFETY**

The Contractor shall ensure contract efforts are managed to prevent injury or damage to contractor, government, or civilian personnel or property. As such, the Contractor's Safety and Health Program shall be compliant with all Occupational Safety and Health Administration (OSHA)(29 CFR 1910) and NASA Safety (NPR 8715.3) requirements and the requirements outlined in the remainder of this section.

The Contractor shall implement and manage a Hazard Communication Program in accordance with Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) Subpart Z, and 29 CFR 1910.1200. This program shall be consistent with and interface to the NASA WFF Hazard Communication Plan. The Contractor shall also: submit to the COR a copy of each safety report submitted to any cognizant agency or local base authorities under this contract; report all mishaps involving damage to government property or injury to personnel (Accident / Incident Report); provide written documentation to the COR of the circumstances surrounding any potentially dangerous situation; ensure that NSROC III personnel who support emergency response are trained in accordance with 29CFR 1910.120 and 29 CFR 1926.65 (e); provide safety-engineering services to designated and/or assigned missions; ensure that Ground and Flight Safety Plans are implemented for each mission and all safety operations coordinated with the Wallops Safety Office; identify hazardous operations and support development of required procedures that cover such hazardous operations and other critical mission specific operations; and provide safety oversight to hazardous operations.

The Contractor shall be responsible for implementing all general operation (crane operation, forklift operation, etc.), personnel safety (explosives and ordnance,

pressure vessels and systems, chemical, radiation, etc.) and facility (equipment calibration, maintenance of safety devices, access control, etc.) requirements. This includes providing for the education, training, and examinations necessary for the licensing or certification of NSROC III personnel.

#### **2.1.2.6. QUALITY ASSURANCE**

The Contractor shall develop, implement, and maintain a Quality Management System that complies with ISO 9001:2008 and obtain certification from an independent auditor within eight (8) months of contract effective date. The Quality Management System shall be compatible and consistent with the risk posture of the Sounding Rockets Program described in Section 1.0, and shall not create unnecessary requirements that fail to produce benefits commensurate with the resources required for their implementation. The Quality Management System shall be flexible and capable of satisfying varying levels of quality control requirements as may occasionally be specifically required for individual work orders. These requirements may be either greater than or less than those required for standard sounding rockets missions.

The Contractor shall assemble a Material Review Board (MRB) that meets weekly to disposition non-conformances, review the status of engineering design changes, and review programmatic level corrective actions.

#### **2.1.2.7. CONFIGURATION MANAGEMENT**

The Contractor shall provide a Configuration Management process for the development, approval, and control of all documents under the control of the Contractor. This process shall be documented in a Configuration Management Control Plan, and shall be approved by the COR. The Configuration Management Control Plan is due ninety (90) calendar days after contract effective date.

The Configuration Management Control Plan shall describe how documents (engineering drawings, schematics, wiring diagrams, procedures, specifications, etc.) are determined to be designated as controlled documents; the associated level of control required; and how such controlled documents are maintained, updated, and revised. All changes, modifications, and upgrades to controlled documents shall be accomplished following approved configuration control procedures as described in the Configuration Management Control Plan. The Configuration Management Control Plan shall be compatible with the dynamic nature of the Sounding Rockets Program and provide for responsive configuration changes as required to meet functional needs.

The Contractor shall assemble a Configuration Control Board (CCB) that meets on a monthly basis. The CCB shall identify all NSROC standard systems for each engineering discipline related to flight hardware, ground infrastructure, or major processes. The board shall have a governing document that identifies each system and defines all of the drawings, schematics, procedures, work instructions, and associated reports. The board shall also identify cognizant engineers for all standard systems and peer review new

designs and design changes for standard systems as they arise.

#### **2.1.2.8. RISK MANAGEMENT**

Significant risks (safety, cost, schedule, and technical) associated with each mission shall be identified and tracked from mission initiation through mission completion. The Contractor shall provide and implement a process whereby such risks can be readily identified for each mission. This process shall, as a minimum, provide the associated probability and consequence of occurrence for each risk identified, and the approach to mitigating or eliminating the risk. The process shall track the risk escalation or reduction history of each risk and provide the associated reasons there for. These risks shall be documented and maintained in a Risk Matrix and be reported on at all reviews (Design, Mission Readiness, etc.) associated with the mission. The principal risks for each mission shall also be reviewed at the Monthly Scheduling Review (see Section 2.1.2.4 of this SOW). A final update shall be provided to NASA and the Principal Investigator for each mission for concurrence after it is fully staged but prior to commencement of the actual launch operations. This final update shall document how each risk was mitigated to an acceptable level. If it is not possible to mitigate all risks down to acceptable levels, justification shall be provided as to why it is appropriate to proceed with launch operations. This final version shall be documented in the Mission Closeout Report. The system for tracking these risks shall be flexible and capable of satisfying varying levels of risk management requirements as may occasionally be specifically required for individual work orders. These requirements may be either greater than or less than those required for standard sounding rockets missions.

#### **2.1.2.9. SYSTEMS ENGINEERING**

The Contractor shall implement a systems engineering process applicable to each mission. The goal of the systems engineering process should be to ensure the complex subsystems integrated into sounding rocket vehicles and payloads function together to satisfy the objectives of the overall mission. Systems engineering tools and techniques shall ensure interactions between systems and across interfaces are systematically evaluated to avoid potential conflict, interference, and/or subsystem failure. The systems engineering process shall be documented in a Systems Engineering Plan, and shall be compatible and consistent with the risk posture of the Sounding Rockets Program. The Contractor shall assign the systems engineering responsibility for the mission to the Mission Manager and shall ensure that individual has sufficient systems engineering expertise.

#### **2.1.2.10. TRAINING AND CERTIFICATION**

The Contractor shall provide a training program for all employees to keep them current with all aspects of their responsibilities (technical or otherwise) for implementation of the Sounding Rockets Program including any qualification, certification, and licensing required for the work being performed. The overall program shall be documented in a Training Plan. The Training Plan is due ninety (90) calendar days after contract effective

date. This program will identify, maintain, schedule, conduct, and document training and certification in support of the Sounding Rockets Program for all personnel at all levels. The Contractor shall determine and provide for adequate training and certification to all personnel resulting in the understanding and qualifications necessary to perform position responsibilities. Specific aspects of the Training Plan (relating to safety, security, etc.) will be reviewed and approved by NASA where applicable. Training to be provided shall include (but not be limited to) relevant technical topics, property management, Information Technology (IT) Security, workmanship and inspection, crane operation, forklift operation, personnel safety and health, HAZCOM, OSS, and explosives and ordnance handling. Such training shall also be made available to a limited number of NASA personnel on an as needed basis. The Contractor shall obtain all licenses and permits required for the performance of work under this contract. NASA shall retain the final approval for all Operational Safety Supervisor and Ordnance Handling Certifications. Records of all training, licenses, and permits shall be maintained by the Contractor. Completed training activities shall be documented on a monthly basis and maintained in the Well Organized Document Repository in accordance with the requirements of Section 2.1.1.4 of this SOW.

With annual SRPO concurrence on budget, schedule, and program relevance the Contractor has the ability to submit for approval additional training and professional development opportunities for NSROC III staff that are job-specific (i.e. NASA training classes, industry provided classes, etc.), and exceed minimum contract requirements.

#### **2.1.2.11. PROGRAM SUPPORT FUNCTIONS**

The Contractor shall participate in, and provide technical support for, program meetings such as Sounding Rockets Working Group meetings and other reviews as requested by the COR. This may include presentations on the Contractor's implementation status, impacts on the program due to proposed requirement changes or budget and funding conditions, or any other aspect of the program for which the Contractor is responsible. These review functions are separate from the Design Reviews and Mission Readiness Reviews associated with individual missions as described in Section 2.2 of this SOW.

The Sounding Rockets Program Office develops and submits proposals to capture new work in response to opportunities and inquiries from other government agencies, NASA Headquarters, and other NASA centers. The Contractor shall be responsible for developing technical and costing information supporting the associated responses as requested by the COR.

The Contractor shall also provide technical and costing information supporting the development of presentations, reports, plans, position papers, etc. necessary for the routine and special reporting requirements of the Sounding Rockets Program Office. These may include inputs for routine senior management reporting, mishap or other investigations, program implementation plans, technology development plans, special project plans, etc.

#### **2.1.2.12. UNITED STATES OF AMERICA EXPORT REGULATIONS**

The Contractor shall be responsible for the timely completion of all relevant requirements of International Traffic in Arms Regulations (ITAR) 22 C.F.R. Chapter I, Subchapter M Parts 120-130. This includes developing and obtaining all required approvals for any Technical Assistance Agreements or Technology Control Plans that may be necessary as a result of foreign national involvement in assigned work. The Contractor shall also be responsible for the timely completion of all relevant requirements of Export Administration Regulations (EAR); Department of Commerce, Bureau of Industry and Security, 15 CFR 730-774.

The Contractor shall be responsible for completing all visitor requests for any individuals requiring access to NASA facilities in support of assigned work and for completing any associated requirements (such as escort requirements).

NASA will obtain all export licenses required for the shipment of any Sounding Rocket Program payloads, launch vehicles, ground support equipment, systems, materials, or supplies that are being shipped by NASA to foreign countries.

#### **2.1.2.13. OFFICE AUTOMATION DEVICES AND SERVICES**

For Contractor employees that work in NASA facilities, the Contractor shall have a requirement to utilize services provided by the Government for all desktop and associated equipment and interoperability requirements (including desktop and laptop computers, software systems, fax machines, and networked printers). The Wallops Center Network Environment (CNE) will supply all infrastructure and associated services.

In order to comply with the Section 508 Standards for Electronic and Information Technology, the Contractor shall perform all software application development, including the development of code, in compliance with the technical standards delineated in Code of Federal Regulations (CFR) Part 1194.21 Software Applications and Operating Systems. Also, the Contractor shall perform all web development in compliance with the technical standards delineated in CFR Title 36, Subpart B Technical Standards, Part 1194.22 Web-based Intranet and Internet Information and Applications.

### **2.2.MISSION TECHNICAL REQUIREMENTS**

The sounding rocket program historical mission manifest over the past 15 years is provided in Enclosure 1, Table 1. Labor hour data broken down by mission complexity level is provided in Enclosure TBD. The NSROC III Contractor shall provide operational flight support using the process defined in Section 2.2 as a Core Requirement to implement the Sounding Rocket Program Baseline Mission Model given in Table 3. A description of the mission complexity levels (MCL) is given in Section 2.2.1.

Table 3. NSROC III Contract Baseline Mission Model

Launch Site	FY2016				FY2017				FY2018				FY2019				FY2020				FY2021				FY2022				FY2023				FY2024				FY2025							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4								
WSMR	2	1	2	3	3	2	2	3	3	3	3	4	3	2	2	3	3	3	3	3	3	1	1	3	3	2	3	3	3	3	3	3	2	2	3	3	3	3	4					
WFF	1		1	1	1		2	1			2	1	1		1	1	1		2	1			2	1	1		1	1	1		2	1			2	1	1		1	1				
PFRR		2				2				2				2				2				2				2				2				2			2							
KWAJ								2								2											2							2										
ARR	1												1								1												1											
Australia				4																				4																				
FY Total Launches	18				18				18				18				18				18				18				18				18				18				18			
MCL	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
1	1		1		1		2				2		1		1		1		2				2	1	1		1		2				2		1		1							
2	1	1	2	5	1	1	1	3	1	2	2	4	2	1	2	4	1	1	2	2	1	1	1	4	1	2	2	3	1	2	2	2	2	1	2	4	2	2	2	3				
3	1	1		3	2	2	1	3	2	1	1	1	1	2		2	2	3	1	2	2	1		3	2	1	1	3	2	1	1	2	1	2		2	1	1	1	2				
4	1	1				1				2			1	1				1			1	1				1				2			1	1				2						

### 2.2.1. MISSION FORMULATION PHASE

The mission formulation phase begins with the NASA scheduled Mission Initiation Conference (MIC), described in Section 2.2.1.1, and ends with the completion of the Requirements Definition Meeting (RDM), described in Section 2.2.1.2.

During the mission formulation phase the NSROC III Contractor shall work with the COR to define the mission's complexity level. The descriptions for the mission complexity levels (MCL) are given in Table 4.

Table 4. Description of mission complexity levels

LEVEL	TYPICAL PAYLOAD CHARACTERISTICS
LEVEL 4	<p>This would typically be a highly complex geospace science or new technology development payload with the following characteristics:</p> <ol style="list-style-type: none"><li>1. New payload design</li><li>2. High complexity payload configuration<ol style="list-style-type: none"><li>a. 3 or more free-flying payload bodies</li><li>b. 5 or more scientific instruments</li><li>c. 3 or more TM links -- data rates up to 10 Mb/sec per link, video</li><li>d. 3 or more deployable boom sets</li><li>e. ACS required</li></ol></li><li>3. Extensive design and analysis required</li><li>4. Extensive fabrication required<ol style="list-style-type: none"><li>a. Experiment structure fabricated by WFF</li><li>b. Experiment skins fabricated by WFF</li><li>c. Extensive vehicle hardware fabricated by WFF</li><li>d. Extensive payload wiring</li></ol></li><li>5. Extensive T&amp;E required</li></ol>
LEVEL 3	<p>This would typically be a solar or astrophysics telescope payload or a moderate complexity geospace science payload with the following characteristics:</p> <ol style="list-style-type: none"><li>1. New payload design</li><li>2. Moderate complexity payload configuration<ol style="list-style-type: none"><li>a. 1 or 2 separating payload bodies</li><li>b. 2 or fewer deployable boom sets</li><li>c. 3 TM links or less -- data rates up to 10 Mb/sec per link</li></ol></li></ol>

	<ul style="list-style-type: none"> <li>d. ACS required</li> <li>3. Moderate design and analysis required</li> <li>4. Moderate/low fabrication required               <ul style="list-style-type: none"> <li>a. Experiment skins fabricated by WFF</li> <li>b. Transition skins required and fabricated by WFF</li> <li>c. Moderate wiring</li> </ul> </li> <li>5. Moderate T&amp;E required</li> </ul>
LEVEL 2	<p>A follow-on flight of a payload that has already been designed and fabricated. This category would typically be flown at WSMR.</p> <ul style="list-style-type: none"> <li>1. Existing payload requiring standard refurbishments and replacement parts:               <ul style="list-style-type: none"> <li>a. Replacement of expended transition skin</li> <li>b. Refurbishment of TM, ACS, and Recovery Systems</li> </ul> </li> <li>2. Moderate Mission/ACS analysis required</li> <li>3. Moderate T&amp;E required</li> <li>4. Recovery required</li> </ul>
LEVEL 1	<p>This would typically be a relatively simple geospace chemical release or undergraduate university experiment payload with the following characteristics:</p> <ul style="list-style-type: none"> <li>1. Existing payload design or new payload design using standard design details</li> <li>2. Low complexity payload configuration               <ul style="list-style-type: none"> <li>a. 1 or 2 simple separating bodies</li> <li>b. No deployable boom sets</li> <li>c. 1 or 2 TM links</li> <li>d. No ACS</li> </ul> </li> <li>3. Minimal Fabrication Required               <ul style="list-style-type: none"> <li>a. One or two skins</li> <li>b. Moderate wiring</li> </ul> </li> <li>5. Low to moderate T&amp;E required</li> </ul>

The mission formulation phase is led by the SRPO Mission Oversight Monitor (MOM) and is targeted to be completed within a period of forty five (45) calendar days after the MIC for most missions. For complex missions a period longer than 45 days may be necessary to complete the mission formulation phase. The timeline for the mission formulation phase will be managed by the SRPO MOM and not by the NSROC III Contractor.

During the mission formulation phase the Contractor team (led by the assigned Mission

Manager) shall assist the SRPO Mission Oversight Monitor (MOM) to develop mission concepts such as launch site considerations, mission support requirements, payload complexity category (as per definitions presented in Section J.1, Attachment F.), launch vehicle and payload configuration, mission schedule (including design, fabrication, integration and testing, field activities and launch date, and post flight requirements including data products delivery schedules), cost estimates, approaches to meeting success criteria and recovery requirements, data product formats, and other pertinent mission defining elements.

The SRPO MOM will work with the Principal Investigator to define appropriate comprehensive and minimum success criteria that meet the scientific objectives of the mission while being achievable for NSROC given the capability of the selected vehicle and sub-systems.

During the mission formulation phase, under direction of the SRPO MOM, (as Previously mentioned in section 1.0) the NSROC III Contractor shall work with the Principal Investigator to identify any hazardous systems or ground support equipment used by the experiment team and acquire the necessary documentation and procedures to have the equipment reviewed by the safety offices to gain approval to use the equipment for integration, test, launch operations, or flight. The Contractor shall develop a Preliminary Hazard Assessment (PHA) for each mission, include it in the RDM package, and provide it directly to the Wallops Safety Office. The PHA shall include a listing of any items that have the potential to require a waiver at the designated launch range.

The Contractor shall also be occasionally required to provide support for the definition of requirements for complex, unusual, multiple launch and/or remote campaign, or other non-conventional missions in addition to that necessary for routine individual mission MIC and RDM requirements as mentioned in section 2.1.2.11.

#### **2.2.1.1. MISSION INITIATION CONFERENCE**

The SRPO MOM will initiate and conduct a Mission Initiation Conference (MIC), which will include representatives from NASA, NSROC, and the scientific Principal Investigator (PI) or mission science team. The Contractor shall assign a mission team to support and participate in the meeting. The SRPO MOM along with the PI presents the mission's science objectives and defines the preliminary performance, instrumentation, operational, and schedule requirements to the Contractor mission team.

#### **2.2.1.2. REQUIREMENTS DEFINITION MEETING**

The SRPO MOM will initiate and conduct a Requirements Definition Meeting (RDM), which will include representatives from NASA, NSROC, and the scientific principal investigator or mission science team. The results of the mission plan created during the mission formulation phase that addresses each of the requirements presented at the MIC is assembled by the Contractor, reviewed and approved by the SRPO MOM, presented at the RDM, and documented in a Requirements Definition Meeting Memorandum

(RDMM) by the Contractor within five (5) calendar days of the RDM. The RDM shall document all information necessary to define and demonstrate how the mission requirements can be achieved and the overall feasibility of the mission in the Requirements Matrix. Any changes to the Requirements Matrix after the RDM shall be approved by the SRPO MOM prior to implementation.

## **2.2.2. DESIGN PHASE REQUIREMENTS**

### **2.2.2.1. FLIGHT SYSTEMS AND GROUND SUPPORT EQUIPMENT (GSE) DESIGN AND ANALYSIS**

The Contractor shall provide all engineering analyses, designs, and supporting documentation for all payload, launch vehicle, and GSE systems (with the exception of those being provided by the mission science team) to meet overall program and individual mission requirements as they emerge. These analyses, designs, and documentation shall completely and unambiguously define and verify the adequacy of the launch vehicle, payload, and associated flight and ground systems to meet all mission requirements, including NASA safety requirements. This shall include all manufacturing drawings, diagrams, plans, schedules, procedures, and other documentation necessary to fabricate, inspect, maintain, refurbish, assemble, integrate, test, and operate all launch vehicles, payloads, and associated GSE in accordance with mission requirements and NASA safety requirements.

The Contractor shall define the processes that will prepare and qualify the payload to meet mission requirements in flight. This includes the definition of a series of functional and environmental tests that will qualify the individual payload systems (including those provided by the mission science team) and the complete payload for flight operations. The tests shall be designed to verify the proper calibration, function, performance, and reliability of all payload systems and shall demonstrate the launch vehicle and payload will function as a complete flight system that is capable of meeting all mission requirements. All processes and tests shall be fully described and documented in an individual test plan for each mission.

Any changes to the Requirements Matrix during the design phase shall be approved by the SRPO MOM prior to implementation.

#### **2.2.2.2. DESIGN REVIEW**

The Contractor shall initiate, staff, conduct, and document a Design Review Meeting for each mission in accordance with the approximate Design Review Meeting milestone contained in the individual mission schedule. The Contractor shall notify the SRPO MOM 10 working days in advance of the scheduled Design Review.

The SRPO MOM will work with the Principal Investigator to define appropriate comprehensive and minimum success criteria for the Design Review that meets the scientific objectives of the mission while being achievable for NSROC given the

capability of the selected vehicle and sub-systems.

During the Design Review Meeting the Contractor shall formally and systematically present and critically review all information necessary to demonstrate that the proposed design and mission approach can meet all mission and safety requirements. The review shall contain presentations by each discipline associated with the mission, including NSROC Safety. The presentations shall be reviewed by a panel, chaired and populated by technically cognizant Contractor personnel within each discipline being presented, SRPO MOM, and any other NASA personnel as appointed by the SRPO MOM. The SRPO MOM shall have approval authority over DR panel membership. The data presented at the Design Review shall demonstrate the adequacy of the proposed design and how the proposed design and fabrication, assembly, integration, and testing process will produce a finished product that will achieve the mission success requirements and comply with NASA safety requirements. Complete descriptions of the proposed test plan for the complete payload and each system associated with the mission (including scientific instruments) shall be included and presented. A listing of all procedures involving hazardous operations, safety-related issues, and assembly of the launch vehicle and payload shall be provided. Procedures of any type involving hazardous operations or safety related issues, which have not been approved by NASA Safety, shall be provided. Any new or revised procedures shall be brought to the attention of the committee and NASA and be made available for review. A preliminary Mission Telemetry Requirements (MTR) which outlines all of the telemetry system parameters, ground support systems, and test requirements shall be included in the Design Review documentation for all missions. A preliminary Flight Requirements Plan (FRP), which outlines range support requirements, flight performance aspects, data product requirements, and field schedules, shall be included in the Design Review documentation for all missions. The FRP shall specifically request all required Wallops Range support including fixed and mobile assets and personnel. The mission schedule from the RDM shall be updated, if necessary, and provided. Any changes in the mission schedule since the RDM shall be justified and documented. Problem areas, inadequacies, and risks shall be identified and documented. All material and supporting documentation to be presented at the Design Review shall be assembled into a single comprehensive Design Review Package with a copy being provided to each individual attending the review. The panel will be responsible for reviewing all information, and assigning action items in all instances where the presentation fails to demonstrate that all mission requirements will be achieved. NASA personnel and the Principal Investigator(s) reserve the right to attend and participate in the Design Review. Any person in attendance at the Design Review has the ability to submit an action item to the panel for consideration.

The Contractor shall generate a Design Review Memorandum (DRM) which summarizes the meeting and formally documents all assigned action items. The DRM shall document that the Design Review package and presentation demonstrated the proposed design and mission approach will meet the mission success criteria. It shall also include the updated mission schedule.

All action items assigned at the Design Review shall be dispositioned prior to the PIR.

The dispositions shall be formally documented in writing in a Design Review Action Item Closeout Memorandum with the approvals of all panel members evidenced by their signatures.

Any changes to the Requirements Matrix during the design review shall be approved by the SRPO MOM prior to implementation.

### **2.2.3. FABRICATION, INTEGRATION, TESTING, and QUALIFICATION PHASE REQUIREMENTS**

#### **2.2.3.1. FLIGHT HARDWARE and GSE FABRICATION**

The Contractor shall fabricate, refurbish, modify, and/or provide and assemble all flight (including launch vehicles and associated systems) and ground support materials, hardware, components and systems necessary to meet mission requirements (with the exception of those being provided by the mission science team and other launch operation support organizations). This requirement includes Contractor provision, inspection, and acceptance testing of all new hardware and equipment and for Contractor inspection, reconditioning, refurbishment, and acceptance testing of all government property (including surplus rocket motors), as necessary. This will be accomplished in accordance with Section 2.1.1.6 of this SOW. Property requiring reconditioning and refurbishment after each mission typically includes, but is not limited to, attitude and rate control systems, recovery systems, boost guidance control systems, gyroscopes, telemetry systems, door mechanisms, and other mission specific hardware.

Any changes to the Requirements Matrix during the fabrication phase shall be approved by the SRPO MOM prior to implementation.

#### **2.2.3.2. PRE-INTEGRATION REVIEW (PIR)**

The Contractor shall hold a Pre-Integration Review (PIR) to assess the readiness of the payload sub-systems and review the testing plan prior to arrival of the science team. The SRPO MOM shall be in attendance at the meeting. At the PIR the integration and testing process for integration of the payload and the flight vehicle is reviewed. At this meeting, the payload, vehicle elements, test plans/procedures, test equipment, facilities and personnel are thoroughly evaluated to ensure successful integration. There is no deliverable requirement for the PIR.

Any changes to the Requirements Matrix during the pre-integration review shall be approved by the SRPO MOM prior to implementation.

#### **2.2.3.3. INTEGRATION, TESTING, and FLIGHT QUALIFICATION**

The Contractor shall integrate, test, and qualify the payload, launch vehicle, and associated GSE to verify that the systems will achieve all scientific requirements.

Any changes to the Requirements Matrix during the integration, testing, and flight qualification phase shall be approved by the SRPO MOM prior to implementation.

#### **2.2.3.4. MISSION READINESS REVIEW**

The Contractor shall initiate, staff, conduct, and document a Mission Readiness Review Meeting (MRR) for each mission in accordance with the approximate Mission Readiness Review Meeting milestone contained in the individual mission task order schedule. The Contractor shall notify the SRPO MOM, 10 working days in advance of the scheduled Mission Readiness Review.

The SRPO MOM will work with the Principal Investigator to define appropriate comprehensive and minimum success criteria for the Mission Readiness Review that meets the scientific objectives of the mission while being achievable for NSROC given the capability of the selected vehicle and sub-systems.

During the Mission Readiness Review meeting the Contractor shall formally and systematically present and critically review all information necessary to demonstrate that all mission requirements will be achieved. The review shall contain presentations by each discipline associated with the mission, including NSROC Safety. The presentations shall be reviewed by a panel, chaired and populated by technically cognizant Contractor personnel within each discipline being presented, SRPO MOM, and any other NASA personnel as appointed by the SRPO MOM. The SRPO MOM shall have approval authority over MRR panel membership. The data presented at the Mission Readiness Review shall demonstrate that the launch vehicle, payload, and associated ground and flight systems are ready to proceed to the flight operations phase and will meet mission requirements; all environmental testing and flight qualifications have been successfully completed; and all required GSE and range support assets and services have been identified and are available. Complete descriptions and results of all testing performed during the integration and flight qualification process for the mission shall be included. A listing of all procedures involving hazardous operations, safety-related issues, and assembly of the launch vehicle and payload shall be provided. Procedures of any type involving hazardous operations or safety-related issues, which have not been approved by NASA Safety, shall be provided. Any new or revised procedures shall be brought to the attention of the committee and NASA and be made available for review. A launch operation Countdown Procedure in accordance with Section 2.2.4.3 of this SOW shall be provided. An updated and finalized Flight Requirements Plan and Mission Telemetry Requirements document shall be included in the Mission Readiness Review documentation. The mission schedule shall be updated and provided. Any changes in the design, test plan, procedures, mission schedules, or mission approach, which have occurred since the Design Review shall be fully documented and justified at the Mission Readiness Review. All material and supporting documentation to be presented at the Mission Readiness Review shall be assembled into a single comprehensive Mission Readiness Review Package with a copy being provided to each individual attending the review. The panel will be responsible for reviewing all information, and assigning action items in all instances where the presentation fails to demonstrate that all mission

requirements will be achieved. NASA personnel and the Principal Investigator(s) reserve the right to attend and participate in the Mission Readiness Review. Any person in attendance at the Mission Readiness Review has the ability to submit an action item to the panel for consideration.

The Contractor shall generate a Mission Readiness Review Memorandum (MRRM) which summarizes the meeting and defines all action items assigned. The MRRM shall document that the Mission Readiness Review package and presentation demonstrated the mission success criteria will be achieved. It shall also include the updated mission schedule.

All action items assigned at the Mission Readiness Review shall be dispositioned prior to the initiation of launch operations. Those dispositions shall be formally documented in writing in a Mission Readiness Review Action Item Closeout Memorandum with the approvals of all panel members evidenced by their signatures.

Any changes to the Requirements Matrix during the mission readiness review shall be approved by the SRPO MOM prior to implementation.

#### **2.2.4. PRE LAUNCH, AUTHORIZATION TO PROCEED, LAUNCH, AND POST LAUNCH SUPPORT PHASE REQUIREMENTS**

The Contractor shall be responsible for all pre-launch, authorization to proceed with launch operations, launch, and post-launch activities as described in this section and for logistics for the payload, vehicle, and GSE for all assigned sounding rocket missions. NASA will make appropriate arrangements for field support services at all fixed and mobile launch ranges based on mission support requirements established by the NSROC III Contractor. These mission support requirements shall be provided to the COR in writing as part of the Requirements Definition Meeting Memorandum (RDMM) and will be updated and included as part of the Flight Requirements Plan. In addition, NASA will be responsible for establishing all necessary Memorandums of Understanding (MOU), Joint Implementations Plans (JIP), and other inter-government agreements associated with all sounding rocket missions. The Contractor shall provide a single individual for each mission designated as the Mission Manager who shall be responsible for the coordination and execution of all NSROC III Contractor related field operations. The Contractor shall also provide a single individual for each mission designated as the Operations Director to manage the pad operations (both technical and logistics) who is knowledgeable and has extensive experience with sounding rocket launch operations and the requirements of the Range Safety Manual (RSM).

##### **2.2.4.1. PRE-LAUNCH OPERATIONS**

The Contractor shall conduct all required pre-launch field operations necessary to verify that the payload and launch vehicle are ready for flight.

#### **2.2.4.2. AUTHORIZATION TO PROCEED WITH LAUNCH OPERATIONS**

The Contractor shall hold a Launch Readiness Review (LRR) to assess the post MRR state of the mission and verify any open items are closed prior to launch authorization. The SRPO MOM, or SRPO Duplicate Authority Designee (DAD), shall be in attendance at the meeting. The Contractor shall poll relevant disciplines and parties to determine launch readiness and confidence in the mission to meet the defined requirements and success criteria. The Contractor shall provide a statement of their readiness in a LRR Memo to the SRPO Chief.

All missions tasked under this contract require the Contractor to receive a NASA issued "Notice to Proceed with Launch Operations" before the Contractor can proceed with launch operations. If the Contractor has failed to demonstrate that the mission performance requirements and other applicable terms of the contract will be met, that risks have been mitigated to an acceptable level, or that action items have been closed to NASA's satisfaction, NASA reserves the right to delay the launch of the mission until such time as the Contractor has addressed all concerns to the satisfaction of NASA. NASA also reserves the right to delay the launch of a mission at any point up to the launch if unforeseen circumstances occur which have a negative impact on the probability that all safety and mission requirements will be achieved. The Contractor shall take any immediate and necessary actions to address such circumstances.

#### **2.2.4.3. LAUNCH OPERATIONS**

The Contractor shall coordinate all NSROC III functions for, and participate in, launch operations utilizing support defined by the Contractor and arranged for by NASA. The Contractor shall develop a written countdown procedure for each mission that includes a launch approval check-off for flight safety and the mission science team's principal investigator or his designee. The designated Range Safety Officer will maintain authority for real time go/no-go launch decisions as they relate to flight safety requirements. The Range Test Director (or other designated launch range representative as appropriate) and the Contractor shall have responsibility for real time go/no-go launch decisions based on the availability and functionality of required launch range provided assets. The mission science team's Principal Investigator will maintain authority for real time go/no-go launch decisions based on scientific criteria (i.e. scientific conditions, functionality of the scientific instruments, and the availability of required range and off range scientific support assets which affect achievement of mission success criteria). The Contractor shall have responsibility for real time go/no-go launch decisions for all Contractor provided systems and other mission specific responsibilities. This includes, but is not limited to, contractor provided launch vehicles, payload systems, ground support equipment, and the requirement to perform real time S-19 flight performance analysis and reviews for boost guided launches from White Sands Missile Range and make real time go/no-go launch decisions based on the results. NASA and the mission science team's Principal Investigator will have authority to stop launch operations at any time during the countdown. For all missions, the Contractor shall plan and coordinate mission

operations (in conjuncture with appropriate payload designs and range support elements) so that two independent sources of payload telemetry data and in-flight positional data are obtained.

The Contractor shall also provide a single individual for each mission designated as the Operations Director to manage the pad operations (both technical and logistics) who is knowledgeable and has extensive experience with sounding rocket launch operations and the requirements of the Range Safety Manual (RSM).

#### **2.2.4.4. POST-LAUNCH FIELD OPERATIONS**

The Contractor shall coordinate and conduct post-launch activities. This includes providing support to ensure the successful recovery of payloads when required by mission success criteria and any other post-launch activities including the demobilization of field assets.

#### **2.2.5. POST-FLIGHT PHASE REQUIREMENTS**

##### **2.2.5.1. POST-FLIGHT DATA REDUCTION**

The Contractor shall reduce and provide all post flight data products for contractor supported systems and activities. This includes the provision of housekeeping and scientific flight data. Within 3 weeks of launch the Contractor shall hold a Data Review meeting to assess if any of the flight data shows anomalous characteristics that need closer post flight studies (reference Section 2.2.5.2) or may be subject to a mishap or anomaly investigation (reference Section 2.2.5.3).

The Contractor shall reduce and provide all post flight data products for experimenter systems and activities. Unless otherwise mutually agreed to by the scientific Principal Investigator, all required data products shall be scheduled for delivery to the mission science team for no later than sixty (60) calendar days after launch of the mission.

##### **2.2.5.2. POST FLIGHT STUDIES**

The Contractor shall conduct post flight studies of each mission and fully document the results. These studies shall compare actual performance and flight parameters of all major systems with those predicted. This includes, but is not limited to, assessments of the: launch vehicle and associated systems; boost guidance system; attitude control system; telemetry system; separation and deployment systems; power supply and timing systems; and recovery systems. Significant discrepancies between actual and predicted performance and flight parameters shall be investigated and resolved. The results of these post flight studies shall be included in the Mission Closeout Report (MCR) in accordance with the requirements of Section 2.2.5.4 of this SOW. The Contractor shall also be responsible for updating and maintaining the NSRP Empirical Dispersion Flight History Database.

### **2.2.5.3. MISHAP AND ANOMALY INVESTIGATIONS**

The Contractor shall identify anomalies, failures, and systemic problems with flight vehicle systems, payload systems, GSE, and analytical methods employed in the NSRP. The Contractor shall obtain information necessary to identify and resolve flight vehicle and payload systems anomalies and failures by means of monitoring devices that provide information on the in-flight functional performance of these systems. These monitoring devices shall be incorporated into the vehicle and payload systems during the design and fabrication phases of each mission. The Contractor shall determine the type, quantity, and location of all such devices with consideration being given to the associated costs. When post flight investigations are unable to determine the actual causes of anomalies and failures beyond a reasonable doubt, such anomalies and failures shall be concluded to be the responsibility of the NSROC III Contractor.

The NSROC III Contractor shall be responsible for the investigation and disposition of NSROC III contractor related Class C Mishaps for injury or illness and all Class D Mishaps and Close Calls as defined in NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping. All such investigations shall be conducted in accordance with all requirements of NPR 8621.1 including the provision of a final report to NASA for each investigation. NASA may conduct an independent investigation of these Mishaps and Close Calls as it deems necessary.

NASA will be responsible for the investigation of all Class A and Class B Mishaps and all Class C Mishaps for property damage as defined in NPR 8621.1. The NSROC III Contractor shall provide all available information to NASA as requested during the course of such investigations and provide personnel to serve on the AIB panels if assigned by NASA. The NSROC III Contractor shall be responsible for implementing all corrective actions resulting from such investigations.

### **2.2.5.4. MISSION CLOSEOUT REPORT**

The Contractor shall provide a Mission Closeout Report (MCR) to NASA for each individual mission. The MCR shall document that all contractual requirements for the mission, including all post flight requirements, have been completed by the NSROC III Contractor. Prior to submittal of the MCR, the Contractor shall conduct a Lessons Learned Review. During this meeting, the payload team will present a summary of the positive and negative experiences that occurred throughout the project. These experiences shall be documented and made available to other payload teams in order to capitalize on efficiencies and risk reduction strategies that can be applied to future projects and reduce the likelihood of reoccurrence of past negative events. In addition to being included in the Mission Closeout Report, all Lessons Learned for each mission shall be maintained separately in the document repository in accordance with the requirements of Section 2.1.1.4 of this SOW.

### **2.3.DEVELOPMENT AND ROUTINE PROJECT ASSIGNMENTS**

The Contractor shall supply the capability to provide support for Development and Routine Projects Assignments (DRPA). Definition of requirements for these discrete efforts will be given to the Contractor by SRPO via Work Orders (WO). The work that may be assigned to the NSROC III contractor includes, but is not limited to: design and analysis (mechanical, structural, electrical, electronic, flight performance, flight dynamics, control system, software, etc.); fabrication (mechanical, structural, electrical, electronic, etc.); engineering and environmental studies; integration and testing; technical support; quality assurance services; field and post flight operations; acquisition and provision of equipment, hardware, materials, and supplies; internship program and outreach projects; and project management efforts to support the Sounding Rockets Program, NASA, other U.S. Government agencies, and reimbursable customer projects and requirements. These efforts are normally of relatively short term duration and may be performed with the same or similar skill mix of personnel required for the implementation of sounding rocket missions. However, complex tasks such as launch range facility management and implementation, the development of new sounding rocket launch vehicles, the development of payload support systems and subsystems, or the implementation of entire missions to standards different than those defined in Sections 2.2.1 through 2.2.5 of this Statement of Work may be required.

Long term support functions may also be required such as general support for facilities management; flight sub-system fabrication, assembly, and testing; launch range operations; general drafting and technical support; etc. It may also be necessary to provide support for specific functions or portions of missions rather than the entire effort required to implement the mission. In these instances the mission support team may be comprised of a combination of civil servant and Contractor personnel. This work is variable in nature and covers a wide spectrum of requirements that must also utilize WFF fabrication and testing facilities. In some cases, the work effort may require joint civil service and Contractor utilization of some government property.

Additionally, the Contractor shall supply the means necessary for providing improved access to space and cost effectively advancing the range of capabilities offered by the Sounding Rockets Program with specific emphasis on new technologies associated with launch systems, attitude control systems, guidance systems, telemetry systems, power systems, etc. as necessary to meet the evolving and complex requirements of the program. This may include, but is not limited to, such things as: the in-house development of new rocket motors and payload support systems and/or their acquisition from commercial sources; the in-house development of new launch vehicles utilizing surplus government and/or commercially available assets; and the acquisition of launch services from commercially available sources. In these instances the project team may be comprised of a combination of civil servant and Contractor personnel.

For reference, a description of DRPA project complexities is included in Table 5. A history of the development and routine project assignments which will become core requirements under the NSROC III contract are included in Enclosure 1, Tables 2 and 3. Labor hour data for the DRPA efforts are provided in Enclosure TBD. The NSROC III

Contractor shall provide support as a Core Requirement to implement the Sounding Rocket Program Baseline DRPA Model given in Table 6.

The Contractor shall hold a monthly DRPA Status Meeting with SRPO presence to report on the status of development efforts and routine projects program wide that sustain and enhance the capability of the sounding rocket program. Topics to cover include inventory maintenance and procurement (including status of purchased off the shelf items, purchased major sub-systems, made in-house major sub-systems, and sub-system refurbishment); ground support equipment procurement, development, and maintenance; facilities maintenance; outreach activities; and internal engineering, testing, or production development projects to standardize, modernize, or enhance the capabilities of the sounding rocket program.

Table 5. Description of DRPA Project Complexity Levels

<b>NSROC III DRPA Category Descriptions</b>	
<b>Category</b>	<b>Description</b>
<b>A</b>	Projects of this nature are technically complex and non-routine. The non-routine nature of these projects may increase the technical risk associated with proper functional performance of the final product. Items falling under this category could include the design and development of a new launch vehicle or payload support subsystem; complex fabrication, testing, and flight qualification of new payload support subsystems; or the fabrication of a highly specialized mechanical component for a satellite.
<b>B</b>	Projects of this nature generally do not require extensive engineering design and analysis efforts. They may involve the acquisition, fabrication, refurbishment, inspection, and/or testing of complex payload subsystems or components for the maintenance of Sounding Rockets Program inventories of flight proven systems with existing designs; or for engineering, fabrication, or testing projects where extensive developmental effort is not required thus reducing the associated technical risks. Examples might include the acquisition of commercially available rocket motors or boost guidance systems; the in-house fabrication of replacement Attitude Control Systems; and the refurbishment of Recovery Systems or vacuum shutter doors.
<b>C</b>	Projects that fall under this category may include routine engineering or technical support which could include either the continuous fabrication or acquisition of relatively simple mechanical and electrical components that are readily available from commercial sources. Examples might include the fabrication of connector brackets, battery boxes, etc. or the acquisition of raw materials and components utilized within payload support subsystems. These projects may also involve the performance of relatively routine engineering analysis or testing.
<b>D</b>	The unique nature of the effort cannot be predicted before the project is defined and is not consistent with the criteria established for either Category A, B, or C projects.

Table 6. NSROC III Contract Baseline DRPA Model

Recurring DRPA Work Orders

Core Category	Work Order Name	Category	Work Order Scope	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Administrative	Commercial Rocket Motor Procurement	B	Provide commercial sustainer motors for applicable Sounding Rocket Missions. This work order is inclusive of a source evaluation board process that results in a motor buy recommendation to SRPO. The procurement includes creation and management of the sub-contracts for the manufacture of assembled propulsion units (including motor case, igniter, propellant casting, insulation, liner, nozzle, and exit cone). This work order also includes the responsibility for monitoring vendor progress on both programmatic and technical performance, as well as acceptance of the assembled propulsion units and related hardware. The scope shall include hardware costs for concurrent qualification/production effort of motors, if necessary.	X	X	X	X	X	X	X	X	X	X
Administrative	F-10 Stock Inventory	D	Assess the amount of inventory in F-10 stock and the material needs for the upcoming year. Procure, inspect, and test as applicable, all COTS materials needed to stock the stockroom for the next contract year. Common stock items such as battery boxes that are fabricated in the NSROC mechanical and electrical shops shall be included. Examples include the fabrication of connector brackets, battery boxes, etc. or the acquisition of raw materials and components utilized within payload support subsystems. Exclude procurement buyer, receipt, and stock room labor on this work order. Include engineering, fabrication, and acceptance testing labor for both purchased and made in-house items on this work order.	X	X	X	X	X	X	X	X	X	X
Administrative	Vehicle Hardware Inventory	C	Maintain an adequate inventory of vehicle systems, ordnance devices, and hardware to support current sounding rocket mission requirements for the current fiscal year. Determine and furnish an adequate amount of vehicle hardware to include: small ordnance devices (i.e. initiators, pressure cartridges, cable cutters, pin pullers, etc.), flight termination components (both electrical and ordnance components), parachutes, fins, staging hardware, nosecones, launch lugs, manacle bands, deployment hardware, and other miscellaneous vehicle hardware. Items shall be entered into the NSROC stock system and ready to be issued out to support the missions when required. This work order to include engineering and technician support to enter the items into stock in a flight-ready condition. Exclude procurement buyer, receipt, and stock room labor from this work order.	X	X	X	X	X	X	X	X	X	X

Technical	Standard Sounding Rocket Sub-System Support – Flight Systems	B	<p>Maintain an adequate inventory of standard sounding rocket sub-systems to support current sounding rocket mission requirements for the current fiscal year. Standard sub-systems include recovery systems, flight termination systems (FTS), nosecone deployment systems, shutter doors, boost guidance systems (BGS), ignition systems, mechanical de-spin systems, separation systems, attitude control systems (ACS), attitude determination sensors, gyros, and command uplink systems. (Procurement of individual pieces, parts, and components as well as fabrication of made-in-house components shall be performed under the F-10 Stock inventory and Vehicle Hardware inventory work orders.)</p> <p>Under this work order, provide support for standard sounding rocket sub-system design, analysis, upgrades, repackaging, refurbishment, assembly, acceptance testing, qualification testing, and documentation creation/maintenance. Documentation includes drawings, schematics, software, checklists, procedures, reports, etc.</p> <p>This work order shall include the engineering labor, acceptance/qualification testing labor, and fabrication labor needed to ensure that each sub-system and associated documentation is fully functional, tested, and in a flight-ready condition to support sounding rocket missions.</p> <p>All new designs, design changes or major hardware changes shall at a minimum be reviewed by the NSROC Configuration Control Board (CCB) and may require a Non-Advocate Review, to include a panel comprised of personnel from, at a minimum, NSROC, AETD, and SRPO.</p> <p>Also provide engineering labor required to perform data reduction and analysis of post-flight sub-system data to evaluate system performance that is over-and-above what is already required during normal post-flight/mission close-out activities.</p> <p>Track labor and material costs for each effort under this work order (i.e. BGS refurbishment, recovery system refurbishment, shutter door assembly and testing, FTS component qualification testing, etc.)</p> <p>Some examples of this work include:</p> <ul style="list-style-type: none"> <li>- Refurbishment of recovery systems and boost guidance systems and acceptance testing of these systems</li> <li>- Assembly, and acceptance testing of attitude control systems</li> <li>- Assembly, and acceptance testing of attitude control system gyros</li> <li>- Qualification and acceptance testing of Flight Termination System components or systems</li> <li>- Assembly, and acceptance testing (if applicable) of made-in-house ignition systems, mechanical de-spin systems, separation systems, attitude control systems, and shutter door systems</li> </ul>	X	X	X	X	X	X	X	X	X	X
Management	Reimbursable Mission Feasibility Study and Planning Activities	B	<p>Participate in preliminary mission planning activities in anticipation of a reimbursable mission. Perform preliminary mission operations planning per objectives presented by the experiment team.</p> <p>Perform flight performance analyses to predict experiment conditions for the reimbursable payload and candidate vehicle.</p> <ul style="list-style-type: none"> <li>- Perform preliminary GNC design trades given the candidate vehicle(s) and flight performance timeline(s).</li> <li>- Perform preliminary instrumentation and power design trades given the candidate vehicle(s) and flight performance timeline(s).</li> <li>- Perform preliminary mechanical interface design trades for the candidate vehicle(s) identified to execute the mission.</li> </ul>	X	X	X	X	X	X	X	X	X	X

			<ul style="list-style-type: none"> <li>- Provide a cost estimate for the mission.</li> <li>- Provide all support services and personnel resources necessary to complete the study. The scope of the support includes mission planning, management, and engineering analysis.</li> </ul> <p>The results of this preliminary study will determine if the Program will proceed with the mission from both a technical and cost standpoint.</p>											
Administrative	Office Supplies and Shop Consumables	D	Procure office supplies and fabrication shop consumables consistent with the programmatic needs. This includes tooling in the fabrication shops, gasses, nitrogen, coolants, lubricants, chemicals, cleaners, lifting hardware, safety items, batteries, tape, oils, garnet, wire, and other smaller items used on a recurring basis.	X	X	X	X	X	X	X	X	X	X	X
Management	Outreach	B	Design, develop, and implement an Outreach Program that will provide educational development activities directed at advancing interest in Science, Technology, Engineering, and Math career paths for students in grades K through 12. This Program shall be implemented within the local community generally within commuting distance of Wallops Flight Facility, although exceptions involving organizations from more distant locations may be considered, but will require preapproval from the Sounding Rockets Program Office. Interns from the Intern Program should be involved in these developmental activities as they can more readily relate to the younger students and serve as role models. Their involvement in these activities will also provide them with a personal developmental experience of their own. A schedule for the program shall be provided to the Sounding Rockets Program Office with monthly reports following that describe activities completed for the monthly reporting period and planned activities for the upcoming period. The contractor may also be requested to support/participate in additional outreach activities developed independently by the Sounding Rockets Program Office or other NASA entities.	X	X	X	X	X	X	X	X	X	X	X
Management	Internship Program	B	Implement a university undergraduate/graduate level student outreach intern/co-op program for the Sounding Rockets Program Office. The program shall provide for approximately five (5) Full Time Equivalent (FTE) positions for each contract year. This target FTE rate need not be maintained consistently throughout the academic year, but should be proportioned between academic semesters and vacation periods to the maximum advantage of the program. The maximum number of FTEs during a month shall not exceed 8. The principal goal of the program shall be to provide a meaningful and relevant work experience for the intern/co-op participants who will provide a readily available pool of experienced recent graduates who may be considered for permanent full time employment in support of the Sounding Rockets Program and other Wallops activities. This will require work assignments (and appropriate mentoring and oversight) supporting actual missions and other tasks as routinely assigned to the NSROC contractor. While the program should principally focus on the career development of candidates involved in engineering, math, and scientific disciplines; it need not necessarily be restricted to those disciplines as there may be needs within the Sounding Rockets Program and Wallops community within other areas such as management, business, etc. At the end of each co-op or internship term the Contractor shall hold a meeting with NASA participation that allows the students to present on the projects or work they accomplished during the term.	X	X	X	X	X	X	X	X	X	X	X

Technical	Anomaly Investigation Board (AIB) Support	D	Provide support for investigating mission failures of NASA-Chaired investigation boards. The scope of this work order covers support by NSROC employees directly assigned to Anomaly Investigation Boards (AIB), as well as any NSROC employees that are requested to provide analyses, testing, or other support to the AIB that is over-and-above what is already required during normal post-flight/mission close-out activities.	X	X	X	X	X	X	X	X	X	X
Technical	Research and Development	D	NSROC shall research and develop strategies and provide implementation plans to improve Sounding Rocket systems and support systems to include new or improved: vehicle stacks/configurations; mechanical systems; telemetry systems; power systems; command uplink systems; recovery systems; GSE for any subsystems; functional capabilities (including but not limited to TM ground stations, machine shop, ACS, environmental, etc). This includes engineering and technician support for conceptual studies to arrive at a white paper proposal.	X	X	X	X	X	X	X	X	X	X
Technical	General Sounding Rocket Program Office Support	D	This General work order is for NSROC support to the Sounding Rockets Program Office. Various types of work orders (WOs) may be issued to include: - Drafting - Test & Integration - Design - Materials - Analysis - Fabrication - Machine or electrical shop operations	X	X	X	X	X	X	X	X	X	X
Technical	Ground Support Equipment (GSE)	C	Design, develop, fabricate, procure, maintain, upgrade, refurbish, repair, and modify Ground Support Equipment (GSE) required for the mechanical, electrical, standard sub-system, and general equipment to provide support for NSROC operations. This also covers additional GSE (power supplies, etc.) to maintain the program capabilities. These GSE included in this class of equipment are not specific to the actual mission GSE but provide for GSE that supports a wider range of mission and projects support as well as GSE for standard sub-systems used on sounding rocket payloads and vehicles. This work order also encompasses the required GSE upkeep, outside the routine maintenance of machine shop equipment and ground stations, and NSROC provided software licenses and support.	X	X	X	X	X	X	X	X	X	X
Technical	WFF Aircraft Office Support	D	The purpose of this general work order is to support the Aircraft Office. Work orders to be issued include: - Drafting - Design - Fabrication - Machine or Electrical shop operations - Test & Integration - Materials - Mechanical/electrical technician support	X	X	X	X	X	X	X	X	X	X

Technical	WFF Balloon Program Office Support	D	<p>The purpose of this general work order is to support the Balloon Program Office. Work orders to be issued include:</p> <ul style="list-style-type: none"> <li>- Drafting</li> <li>- Analysis</li> <li>- Design</li> <li>- Fabrication</li> <li>- Machine or electrical shop operations</li> <li>- Test &amp; Integration</li> <li>- Materials</li> <li>- Training</li> </ul>	X	X	X	X	X	X	X	X	X	X	X
Technical	WFF Range and Mission Management Office Support	D	<p>Provide mechanical and electrical technical support to Code 840/Range and Mission Management Office. Support shall include work orders for the refurbishment, installation, unscheduled maintenance, and configuration of Wallops Island Launch Range facilities and equipment. This includes but is not limited to; rocket launchers, payload and rocket motor handling equipment, fixed and portable shelters, environmental control equipment, and launcher and rocket motor firing control equipment and interfacing cabling. Additional support may include performing the functions of Pad Manager; performing launch vehicle inspection, testing, assembly, buildup, and staging operations; performing mechanical and electrical fabrication support; engineering design and drafting support; engineering analysis support; storm\emergency preparations; providing logistics support associated with various launch range activities; providing training; machine or electrical shop operations, test &amp; Integration, mechanical or electrical technician support, and ordering\ furnishing materials.</p>	X	X	X	X	X	X	X	X	X	X	X
Technical	WFF AETD Code 569 Support	D	<p>The purpose of this general work order is to support the AETD Electrical Engineering Branch (Code 569). Work orders to be issued include:</p> <ul style="list-style-type: none"> <li>- Fabrication</li> <li>- Materials</li> <li>- Mechanical/Electrical Technician Support</li> <li>- Environmental Test Support</li> </ul>	X	X	X	X	X	X	X	X	X	X	X
Technical	WFF AETD Code 548 Support	D	<p>The purpose of this general work order is to support the AETD Mechanical Engineering Branch (Code 548). Work orders to be issued include:</p> <ul style="list-style-type: none"> <li>- Project management</li> <li>- Drafting</li> <li>- Fabrication</li> <li>- Machine or electrical shop operations</li> <li>- Environmental testing</li> <li>- Misc. materials, hardware, and supplies</li> <li>- Electrical components, wiring, and assembly</li> <li>- Mechanical assembly</li> <li>- Analysis</li> <li>- Mechanical/Electrical Technician Support</li> <li>- Motor handling operations</li> </ul>	X	X	X	X	X	X	X	X	X	X	X

Technical	NASA Reimbursable Projects Support	D	Provide support for various reimbursable projects issued by NASA. An average of 3-4 projects are ongoing at any given time. Work orders to be issued include: - Drafting - Analysis - Design - Fabrication - Machine or electrical shop operations - Test & Integration - Materials, hardware, or supplies - Training - Project management - Environmental testing - Electrical components, wiring, and assembly - Mechanical assembly - Ordnance logistics, including receiving ordnance and delivering it to the launch sites such as flight termination system ordnance, pyrotechnics, and solid rocket motors - Motor handling operations	X	X	X	X	X	X	X	X	X	X
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**Non-Recurring DRPA Work Orders**

Core Category	Work Order Name	Category	Work Order Scope	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Administrative	NASA Owned Sustainer Rocket Motor Procurement	D	Perform the procurement activity for the NASA owned sustainer rocket motor production effort. This procurement will include creation and management of the sub-contracts for the manufacture of assembled propulsion units (including motor case, igniter, propellant casting, aft closure, insulation, liner, nozzle, and exit cone). Technical specifications, SOWs, drawings, and tooling hardware (from the prototype development effort) are provided by NASA.		X						X		

Technical	Sounding Rocket Vehicle Long Term Flight Analysis and Trending	B	<p>Assess the performance of the commercial and surplus rocket motors used by the Sounding Rocket Program (SRP) by analyzing flight data for each mission, comparing flight data to historical flight data of the motor/vehicle, and looking for any potential trends or anomalies in the data. The goal of this work order is to perform a variety of analyses and studies that will help to identify the risk, causes, effects, and mitigations that will be used by SRPO and NSROC management in their decisions regarding the sounding rocket program vehicle stable.</p> <p>NSROC is requested to assign a team of personnel from appropriate disciplines to accomplish this long-term work order and to define a work order leader that will interface closely with NASA personnel. NASA personnel, both SRPO and AETD, will be participants in team activities and will use many of the analyses provided by the NSROC staff.</p> <p>Examples of studies to be performed under this work order include:</p> <ol style="list-style-type: none"><li>1. Risk Assessment – define the risks associated with the various failure modes for all vehicle configurations, considering issues associated with specific launch range as appropriate, and summarize using the 5x5 likelihood and consequence matrix approach.</li><li>2. IIP analyses – perform IIP analyses on the vehicle configurations used at WSMR to determine margins on worst case vehicle failure modes that would result in a likely terminate action.</li><li>3. Dispersion/Effects analyses – track the empirical dispersion of all vehicle configurations</li><li>4. Flight History Research – record and track anomalies that have occurred on each sounding rocket motor and vehicle configuration to determine if any trends are occurring</li><li>5. Flight Environment Data -- analyze the flight environment data that is routinely collected on sounding rocket flights for each vehicle configuration and calculate the maximum predicted environments for each vehicle stack. For vehicle configurations that fly flight termination systems, compare the flight levels to the qualification levels of the FTS system to ensure compliance with FTS requirements.</li></ol>	X	X	X	X	X	X	X	X	X	X
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Technical	High Performance Surplus Rocket Motor Trade Study	A	<p>Support development of a new suborbital launch vehicle using high performance surplus rocket motors. Overall management of the Launch Vehicle Implementation will be executed by SRPO.</p> <p>1. Support SRPO in transferring the surplus high performance rocket motors from their current military storage location to WFF:</p> <ul style="list-style-type: none"> <li>- Support telecons and meetings to work out logistics.</li> <li>- Fabricate/procure and test, as appropriate, shipping and handling hardware.</li> <li>- Receive and handle the motors for storage on Wallops Island.</li> </ul> <p>2. Participate in a trade study, in partnership with AETD personnel, to identify the optimum approach to realize an integrated surplus high performance rocket motor stage.</p>		X		X		X		X		X
Management	NSROC III Contract Deliverables	B	<p>Provide the NSROC III contract deliverables as required in the Prime Contract Statement of Work, including:</p> <ul style="list-style-type: none"> <li>- Occupational Safety and Health Plan</li> <li>- Configuration Management Plan</li> <li>- Quality Manual</li> <li>- Training Plan</li> <li>- Information Technology (IT) Security Plan</li> <li>- Risk Management Plan</li> <li>- Systems Engineering Plan</li> </ul>	X									
Technical	High Data Rate Telemetry System Implementation	C	Develop, procure, and qualify telemetry components and ground station assets to support an x-band telemetry system.		X	X	X						
Technical	Propulsion Support	D	Provide ongoing consultant technical support to the NASA Sounding Rocket Program relating to propulsion systems, diagnostic support, and review of anomalous performance. Support may include subject matter expert teleconferences and evaluations on propellant/formulations, pyrotechnic systems, igniters and other energetic systems. It is not expected that more than 10 hrs/month will be required to support activities during normal times.	X	X	X	X	X	X	X	X	X	X
Management	Remote Launch Site Survey	C	Support a site survey of the remote site launch range to be used in the current fiscal year in support of SRPO missions. This effort will involve survey of existing facilities, infrastructure, and capabilities at the site. A report and/or plan will be produced outlining the necessary NSROC support to accomplish the planned missions at the remote site. In both cases, it is anticipated launcher installation will be a major undertaking of NSROC. The site survey trip is tentatively scheduled for an approximate 2 week period. There will be some NSROC electrical engineering support required to help identify ground instrumentation required to support these missions however travel is not anticipated for this functional area.	X		X		X	X		X		
Technical	Launcher Maintenance: Non-Routine	B	<p>Provide the labor and materials necessary to perform major maintenance or refurbishment to sounding rocket launchers located at various launch sites (including but not limited to Wallops Island, Poker Flats Research Range, Kwajalein, and Andoya Rocket Range) that are outside the scope of routine maintenance and configuration for SRPO launches.</p> <p>The scope of work shall include, but not be limited to:</p> <ul style="list-style-type: none"> <li>- Perform major modifications, repairs and upgrades as necessary for individual</li> </ul>		X		X		X		X		X

		<p>Sounding Rocket Program launches or campaigns;</p> <ul style="list-style-type: none"><li>- Major modifications/repairs/upgrades may include: refurbishment of the accompanying launcher control consoles and associated wiring and boom mounted umbilical cabling between the launcher junction boxes and payload connector; maintenance, repair, and/or replacement of firing lines, power cabling, and payload umbilical cabling between the launcher and blockhouse; replacements of chains and sprockets on elevation drives, braking systems, relocation of land lines and pneumatic lines; completion of landline checkout procedures; removal, inspection, and repair/replacement of components as required</li><li>- Development (design, fabrication, and testing) of any component of the launcher (to include retractable fittings, launch rails, support legs, etc.) to be able to support all standard sounding rocket vehicles</li><li>- Installation of mobile launchers on launch sites (both permanent and remote) to support missions</li><li>- Remote range support: checkout and prepare launchers for shipment, ship launchers to range, installation, checkout, and certification, remove and pack launcher for shipment to WFF or alternate location.</li><li>- NSROC shall be able to track labor and material costs for each effort under this work order</li></ul>										
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## **Acronym List**

AETD	NASA Advanced Engineering Technology Directorate
ARR	Andoya Rocket Range, Norway
CCB	Configuration Control Board
CFR	Code of Federal Register
CM	Configuration Management
CO	Contracting Officer
COR	Contracting Officer's Representative
CSDB	Costing Summary Database
CWBS	Contract Work Breakdown Structure
DAD	SRPO Duplicate Authority Designee
DR	Design Review
DRM	Design Review Memorandum
DRPA	Development and Routine Project Assignments
EAR	Export Administration Regulations
FAR	Federal Acquisition Regulations
FOM	Facility Operations Manager
FRP	Flight Requirements Plan
GIDEP	Government-Industry Data Exchange Program
GPS	Global Positioning Satellite
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
HAZCOM	Hazard Communication
HCS	Hazard Communication Standard
IAGP	Installation Accountable Government Property
ISO	International Standards Organization
IT	Information Technology
ITAR	International Traffic in Arms Regulations
JIP	Joint Implementation Plan
KWAJ	Kwajalein
LAN	Local Area Network
LRR	Launch Readiness Review
MCL	Mission Complexity Level
MCR	Mission Closeout Report
MIC	Mission Initiation Conference
MOM	SRPO Mission Oversight Monitor
MOU	Memorandum of Understanding
MRB	Material Review Board
MRR	Mission Readiness Review
MRRM	Mission Readiness Review Memorandum
MSDS	Materials Safety Data Sheet
MTR	Mission Telemetry Requirements
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirements

NFS	NASA FAR Supplement
NSROC III	NASA Sounding Rocket Operations Contract III
NSRP	NASA Sounding Rockets Program
OSHA	Occupational Safety and Health Administration
OSS	Occupational Safety Supervisor
PFRR	Poker Flat Research Range in Fairbanks, Alaska
PIR	Pre-Integration Review
RDM	Requirements Definition Meeting
RDMM	Requirements Definition Meeting Memorandum
RSDP	Range Safety Data Package
RSM	Range Safety Manual
SNI	San Nicholas Island
SOW	Statement of Work
SVAL	Svalbard, Norway
TPIF	Technical Performance Incentive Fee
VAB	Vehicle Assembly Building (WSMR facility)
WFF	Wallops Flight Facility
WO	Work Order
WOCR	Well Organized Central Repository
WSMR	White Sands Missile Range (ARMY)
WSTF	White Sands Test Facility (NASA)

Table 7. Major Contract Deliverables\*

<b>Deliverable Name</b>	<b>Due</b>
Phase-In Plan	With proposal
Occupational Safety and Health Plan	On effective date of NSROC III
Quality Manual	90 calendar days after effective date of NSROC III
Configuration Management Plan	90 calendar days after effective date of NSROC III
Training Plan	90 calendar days after effective date of NSROC III
Information Technology (IT) Security Plan	TBD
Risk Management Plan	TBD
Systems Engineering Plan	TBD
Phase-Out Plan	90 calendar days after request from COR

\*Mission Milestone and other meeting deliverables defined in Table 2, Section 2.1.2.4.